Surgery, Gynecology and Obstetrics

An International Journal
Published Monthly

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Volume VI
January-June, 1908

PUBLISHED BY
THE SURGICAL PUBLISHING COMPANY OF CHICAGO
103 STATE STREET, CHICAGO
1908

1058

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THE SURGICAL PUBLISHING COMPANY
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1908

SURGERY, GYNECOLOGY AND OBSTETRICS

AN INTERNATIONAL MAGAZINE, PUBLISHED MONTHLY

VOLUME VI JANUARY, 1908 NUMBER 1

ON THE TREATMENT OF THE PEDICLE AND THE URETER IN NEPHRECTOMY

BY JOHN BLAND-SUTTON, F. R. C. S., ENGLAND
Surgeon to the Middlesex Hospital

THE chief structures to be considered in the pedicle left after removal of a kidney are the renal artery; the renal vein, and the ureter; the less important constituents are small blood-vessels, lymphatics, sympathetic nerves, and connective tissue. The all important structures to be secured are the renal artery and vein; they are the biggest blood-vessels concerned in the removal of any organ, and failure to properly secure these vessels will probably cost the patient his life. The treatment of the ureter is worth some consideration, especially from the patient's point of view, and it is my object in this communication to draw attention to some inconveniences which may be avoided, if the surgeon will give some attention to this duct.

The simplest conditions under which the pedicle is ligatured are those in which the kidney is removed for serious damage, or injury to the ureter which cannot be repaired by a plastic operation, or for a renal tumour of moderate size. The organ is exposed either by an anterior (transperitoneal) incision, or through an incision in the ileo-costal space; it is shelled out of its capsule, the ureter is found, and the pelvis of the kidney should be carefully isolated with the assistance of forceps from the renal vessels. It sometimes facilitates the isolation of the renal pelvis if the ureter is clamped low down and divided between forceps; the upper end is then useful in enabling the pelvis to be enucleated from the connective tissue in which the main vessels are embedded.

When the pelvis is cleared from the vessels, the pedicle is transfixed with a double ligature of silk and tied in two halves; to make it more secure, it may be afterwards encircled and tied by a separate piece of silk. The distal end of the ureter is then tied with a piece of thin silk, and after the mucous membrane exposed on its cut surface has been wiped with an aseptic dab, it is allowed to retreat behind the peritoneum.

The great point in this method of dealing with the pedicle is to avoid including in the ligature any portion of the pelvis. In simple conditions, it is easy with a little attention to completely isolate the pelvis in this way when it is normal in size, or only moderately dilated. When the pelvis is dilated into a huge sac some modification is required, because as the pelvis dilates it spreads the vessels over its circumference, as is shown in Fig. 1. The vessels which cross over such a dilated pelvis are worth some attention; in the normal condition the renal artery on reaching the sinus of the kidney breaks up into four or five branches, which lie embedded in loose connective tissue between the calyces on their way into the cortex. When the kidney, from any cause, becomes slowly converted into a multilocular sac, known as a hydronephrosis, the cortical tissue atrophies, and the renal artery and its branches notably diminish in size. Those terminal branches which normally

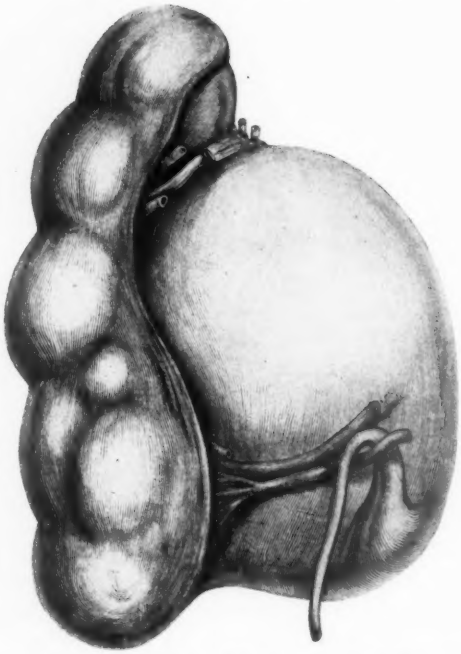

Fig. 1. A hydronephrosis shewing the way in which the renal vessels are stretched across the dilated renal pelvis. Removed by operation.

lie between the calyces become stretched and attenuated by the slowly distending pelvis until they measure as much as 10 or even 15 cm. in length. In removing a kidney of this kind, all these long vessels crossing the dilated pelvis require to be seized with hæmostatic forceps and tied separately with thin silk; in such a case there is no renal pedicle in the ordinary acceptation of the term.

It has been suggested that the ureter is occasionally obstructed by branches of the renal artery, taking an abnormal course, and the specimen represented in Fig. 1 might be supposed to illustrate this condition, for the ureter at the time I removed that hydronephrotic sac was tightly constricted by the vessel over which it bends. I am convinced that this constriction of the ureter by the vessels is the outcome of the increase in size of the pelvis distending the parts. It is quite true that no other cause can be found to account for the hydronephrosis, but this is true of all huge hydronephroses, and I have advanced arguments elsewhere to support the view that such disorganisation of the kidney is due to causes operating in antenatal life. This, however, is a digression from the main purpose of this paper.

On many occasions I have watched surgeons tying a kidney-pedicle and take no care to isolate the pelvis, but transfix it with the pedicle-needle. This not only makes an extremely thick pedicle, but it is fraught with another danger if the kidney is being removed for septic trouble, for the ligature will become septic and probably slough, or infect the veins which will in consequence become filled with septic thrombi. The kidney represented in Fig. 2 illustrates this point, for it had been explored seven years previously and a calculus removed; later it became converted into a calculous pyonephrosis and was removed; by carefully clamping the ureter and isolating the pelvis, the vessels were easily isolated and ligatured without in any way infecting the wound by leakage of septic matter from the ureter or renal pelvis.

Fig. 2. A kidney removed for calculous pyelitis and recurrent calculi. A solitary calculus had been removed from the kidney seven years previously.

There are conditions in which it is impossible to isolate the ureter and pelvis from the pedicle, especially in cases of chronic suppuration and tuberculosis of the kidney; all the surgeon is able to do, is to enucleate the kidney from its thickened capsule and then transfix and ligature the various structures in a mass, including the vessels at the sinus of the kidney, so that when the organ is detached the pedicle sticks up in the operation area like a cabbage stump. In cases of this kind a suppurating stump is inevitable, and I will briefly detail the facts of three cases which shew the inconveniences which sometimes arise.

In 1898 I removed by the transperitoneal method the left kidney of a woman 45 years of age, which, in consequence of an old standing calculous pyonephrosis, had become enlarged to the size of a big cocoa-nut; the perirenal fat had become infiltrated, and this helped to complicate matters. I succeeded in removing the kidney with its capsule and the infected fat; the stump left after the pedicle was ligatured stuck up like a cabbage stalk. A portion of the renal pelvis was included in the ligature, but I was unable to detect the ureter in the thick tissues immediately surrounding the pedicle. The wound slowly healed, and a sinus persisted for ten weeks. After the closing of the sinus, the patient began to complain of pain in the region of the stump, and pus appeared in the urine in small quantity, which, for a time, made me suspect that the right kidney might be giving trouble. Eleven months after the operation, the patient was seized with agonising pain in the left side, in a few hours the pain subsided; next morning whilst voiding urine she had a sudden pain in the urethra, and feeling something sticking out, pulled on it, and to her surprise it was the silk employed for the pedicle. The pus soon cleared up in the urine, and when I saw the patient two years later, I ascertained that she had remained free from pain.

In this instance the course of events would appear to be this: the pus around the ligature found its way down the ureter after the sinus closed, and contaminated the urine; gradually the silk separated from the pedicle, and entering the ureter, was passed downwards to the bladder with all the distressing symptoms of renal colic.

In another instance I performed nephrolithotomy on a man and removed five uric acid stones from the pelvis of his left kidney; he made an excellent recovery and returned to military duty on the North West Frontier of India. Four years later his symptoms returned, and it became necessary to remove the kidney. Nine uric acid calculi of various sizes were embedded in the cortex, and there was difficulty in securing the pedicle safely. After the operation there was a troublesome sinus for a year, and this slowly contracted to a very narrow channel, barely admitting a thin probe. When the sinus narrowed in this way, he began to complain of pain in the left loin, and to his disappointment pus and mucus appeared in the urine and made him uneasy in regard to the condition of the right kidney. I felt certain that the pedicle contained an abscess connected with the ligatures and advised the patient to have the sinus explored. This was carried out under ether, and as I surmised, the upper end of the ureter formed a small cyst which communicated with an abscess cavity the size of a thimble, containing the silks used for the pedicle. These were removed, pus disappeared from the urine, and the pain from the back; the sinus in the loin promptly closed. A year later the patient reported himself in excellent health.

The last case I wish to consider is of greater importance, because it practically ruined the life of a naval engineer. A stout, well-formed man, 38 years of age, had his kidney removed by a surgeon who had given great attention to renal surgery. The operation was performed for calculous pyonephrosis by the lumbar method, and there was great difficulty in securing the pedicle. The patient remained in hospital for several weeks and then left with a sinus; from time to time an abscess formed in connection with this sinus, and he passed the next three years of his life in and out of the hospital. Occasionally a small quantity of urine would dribble through the sinus. Eventually he came under my care, and this dribbling of urine made me suspect that some renal tissue had been left on the pedicle. I was so convinced of this that I determined to thoroughly explore the sinus down to the original stump. This was by no means an

easy matter, for the patient was a big muscular man and the sinus traversed tissues rendered tough and inelastic by chronic inflammation. However, I succeeded in tracing the sinus to a rounded piece of kidney tissue as big as the terminal segment of a thumb connected with a cyst, formed of a portion of the pelvis, which communicated freely with the ureter. This cavity, formed by the remnant of the renal pelvis, contained three facetted calculi, two of the size of cherry stones and the third a quadrilateral piece, nearly 2 cm. square and 5 cm. in thickness. These were removed with the remnant of the kidney and its miniature pelvis. I heard of the patient a year later, he was free from pain, but had become so "hospitallized" that he had taken a great dislike to work and preferred to be considered an invalid.

In order to show that removal of the kidney is a successful operation if careful attention be devoted to the pedicle, it may be worth mention that during the last seven years I have performed 58 consecutive nephrectomies with recovery. The operation was performed for the following conditions: Injury to ureter 1; tumours 10; tuberculosis 4; calculous pyonephrosis 19; recurrent calculi 3; hydronephrosis 17; suppurating hydronephrosis 1; pyonephrosis and ureteritis 3.

OBSERVATIONS UPON THE TREATMENT OF CHRONIC DISEASES OF THE STOMACH

By B. G. A. MOYNIHAN, Leeds, England

DURING the last few years there has been great surgical activity in the treatment of diseases of the stomach. The number of cases upon which I have operated, and the lapse of time since the earlier cases were treated, have enabled me to draw certain conclusions which now regulate my practice in respect of the simple, that is the non-malignant, diseases of the stomach and duodenum. I think all who have had any considerable experience in the surgery of chronic maladies of the stomach will agree with me when I say that the most serious, and the most difficult problem which now confronts us is the proper selection of cases for treatment by the surgeon. It is no doubt true that in the past a number, I think only a small number, of cases have been treated by operation, which would have been better left to the continued care of the physician. Surgery may not have done harm, but it has certainly not done good; and the purpose of surgery is not a merely negative one, some positive benefit should come to reward the patient for the risk and discomfort to which he has been subjected.

It is in the discovery of the appropriate case for the surgeon that our chief work now lies. If a consecutive series of, say, 100 cases of chronic simple disease of the stomach are seen by a surgeon, he will probably be able to say of at least 95, not only what the nature of the disease is, but what is the most apt method of treatment for it; but in the remaining five the task of deciding whether there is actual organic disease or not will be almost or quite insuperable without an exploration of the abdomen. There are cases that is to say, wherein the mimicry of the clinical picture of chronic ulcer is remarkably exact. Such patients are usually women, they have suffered long, and have suffered, by their own account, such agony and so great misery, that the prospect of even the gravest operation is hailed with thankfulness, if only relief may come from it. The investigations of the physician may have convinced him that organic disease is at the root of the matter, and an urgent call for the performance of gastro-enterostomy may be conveyed from him to the surgeon. The following case is an example: —

Case 1. Miss S. F. Aged 32. Since the age of 16 she has suffered much from "indigestion." Pain comes on, generally, within a very short time of taking food, sometimes after the first mouthful has been swal-

lowed, so that occasionally she only eats a very small quantity before being compelled to get up and leave the table. At other times pain does not come on for an hour or more after food, and sometimes not for four hours. Whenever it comes it is relieved by vomiting. The pain is seated in the middle line of the abdomen on the left side of the chest, and extends up into the shoulders and the back of the neck. Flatulence is sometimes very distressing. Nine years ago she had hæmatemesis, but no great quantity of blood was lost. During the last few months the pain and vomiting have got worse, and now she vomits after every meal. When under observation in the Infirmary she vomited constantly after food, sometimes directly after taking a meal, sometimes an hour after. She has lost 3 stones in weight. The abdomen is thin; the stomach reached barely to the umbilicus on inflation. A few minutes after inflation with CO_2 the small intestine is seen to fill, and intestinal movements are visible. Test meals show no evidence of stasis, and no chemical alteration. The operation disclosed no abnormal condition. The patient after operation was better for about two weeks; then vomiting began again. The result of the operation was explained to the patient, and she was told that no visible disease was present. Her condition subsequently underwent a great improvement, and she now eats well and has regained most of her lost weight. It is interesting to remember that had gastro-enterostomy been done in this case bile would as always, have entered into the stomach. The material vomited would have contained bile and a technical fault in the anastomosis have been considered responsible. The fault would, of course, have lain, not on the method in which the operation was effected, but in the performance of the operation when no indication for it was present.

Again let me quote another case:—

Case 2. Miss M. R. Aged 33. Seen with my colleague Dr. T. Wardrop Griffith. The history was that 2½ years ago the patient began to have burning pain in the head, as though "something was running about." Later, she had pain in the body, in the epigastrium and left side. The pain was almost constantly present, but was accentuated by taking food. She felt, however, as if she could not leave off eating, though she felt very full. She constantly had a sensation of hunger. She was greatly troubled with wind; the body was distended, and she belched wind profusely. Sometimes she feels as though the stomach was working. The pain sometimes comes on at night time, and keeps her awake. She is not improved by rest, but has benefitted by restriction of the diet to fluids. Lately her symptoms have been more severe, and she has lost weight, from 8 st. 6 lbs. to 5 st. 4 lbs. There has never been any vomiting. Dr. Griffith thought that peristalsis was to be seen in the stomach, and my house surgeon agreed with him. I never saw this, though the abdominal wall was so thin, that the intestinal movements were clearly visible. At the operation nothing abnormal was discovered and the abdomen was therefore closed at once.

In both these cases I explored the abdomen, and found no evidence whatever of organic disease. The stomach was thin, the walls almost translucent, there was no ulcer, there were no adhesions, there was no displacement; the duodenum, the gall-bladder and the appendix were all quite natural in appearance. What was to be done for these patients? In looking through my cases of the last few years (SURGERY, GYNECOLOGY AND OBSTETRICS, 1907, i. 682) I have found 6 such cases and on them I performed gastro-enterostomy. Nowadays I should certainly not do so. When a stomach which shews no evidence of organic disease is discovered, there is no indication for gastro-enterostomy whatever the nature of the symptoms may have been. Even if haematemesis has been present this rule should still hold good. For, if dyspepsia of the chronic or recurrent kind is dependent for its existence upon a chronic ulcer of the stomach or the duodenum, that ulcer is a visible and a tangible thing. The ulcer that cannot be demonstrated to the entire conviction of the onlooker does not exist. No matter how urgent the recommendation for gastro-enterostomy may have been the surgeon should on no account perform it in the absence of a demonstrable need for it. It may be asked, "If the symptoms of so long a duration are not due to ulcer, what is the cause responsible for them?" To this question there is at present no satisfactory answer. The stomach in such cases is often, I think always, thin, membranous, almost translucent, as though deficient in its musculature. Yet stasis is not present, the stomach empties itself within the normal time. It may be that it empties its contents ill prepared, into an intestine whose rebellion at its improper supply is expressed in those symptoms of which the patient makes complaint. But this is mere hypothesis. The one clue, which, when followed up in these cases will lead, I think, to their discovery before operation, is the absence of an orderly arrangement of the symptoms. In all cases of chronic ulcer of the stomach or duodenum the symptoms are well-defined and are stated by the patient in terms of accuracy and precision. There may be intervals of perfect freedom from suffering, but when symptoms are present they are orderly in their appearance. In the absence

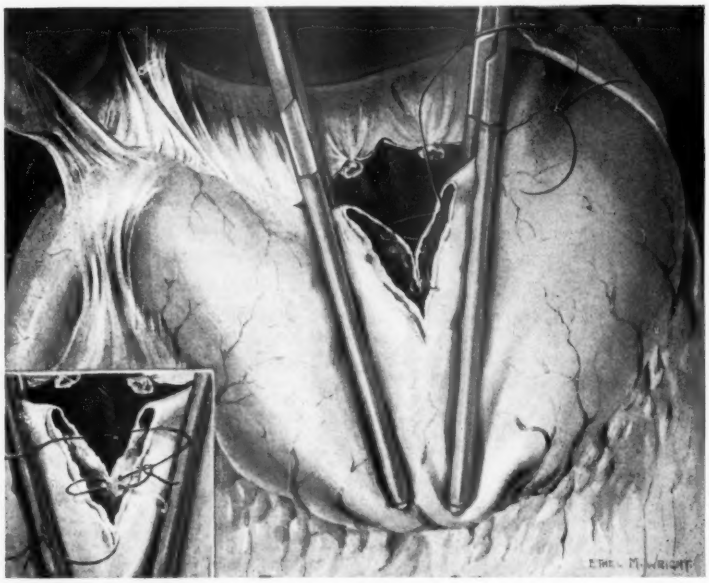

Fig. 1. Excision of an ulcer on or near the lesser curvature of the stomach. The clamps are applied to include the ulcer which is excised after separation of the gastro-hepatic omentum. In the small figure the first stitch is shewn.

of organic disease there is often a caprice in every aspect of the disease. Pain comes early or late, is now worse, now better, goes spontaneously and comes irrespective of food, solid or fluid. There is an erratic sensitiveness about the stomach. The story of one day's experience of symptoms is different from that of every other day. There is chaos where there should be order.

Another class of cases in which I have ceased to perform gastro-enterostomy is that in which the ulcer is seated on the lesser curvature close to the cardiac orifice, or within the cardiac half of the stomach. In three such cases I performed gastro-enterostomy when this condition was found. All the patients were better after the operation for a time, but this recovery was not to be compared with that easy, smooth and full return to health which would have occurred had the same ulcer been prepyloric or duodenal. One of the patients has lately relapsed, and is almost as ill as before the operation, in a second the symptoms have recurred to an extent which will probably lead me to advise the excision of the ulcer; the third case is still troubled with pain but not severely. What then is to be done for such ulcers? In my opinion they should be excised. If the ulcer be near the cardia and adherent, possibly to the pancreas, the task of excision is no light one. The technical difficulties are then far greater than in an ordinary case of partial gastrectomy for carcinoma. But excision must be practiced if at all possible, if relief is to be given. I have excised five such ulcers and the result, in all cases, has been completely satisfactory. Happily all the ulcers were solitary. If such an ulcer had been complicated by the existence of a second ulcer at the pylorus, then excision and gastro-enterostomy would both have been necessary. The technique of this operation of excision is shown in the accompanying figure.

When a chronic ulcer is seated at the pylorus along the lesser curvature close to the pylorus ("prepyloric") or, in the duodenum, gastro-enterostomy should be done. In the proper case no operation in all surgery is so completely satisfactory as this. The bad results of this operation are due, I feel sure, almost without exception to an improper selection of cases.

If the ulcer is causing obstruction, or if in its later healing it is likely so to do, then gastro-enterostomy will surely effect complete relief.

The form of gastro-enterostomy I adopt is that described in "Abdominal Operations." The no-loop operation, with clamps and two rows of suture is performed, as I there depict it. Indeed, the only question which now seems open is concerned with the direction of the jejunal application to the stomach. As I originally described it the jejunum was placed so that from the flexure it ran downwards and slightly to the right, as if it were tending towards the appendix. Dr. W. J. Mayo suggested that the anastomosis should be directed downwards and to the left, following what he described as the natural direction of the jejunum. I am not at all sure that the anatomy he describes is accurate, for the position of the jejunum as the patient lies on the operation table may not be the same as it is when the patient is erect. We find the jejunum tending from the flexure towards the upper part of the kidney merely, I think, because that is the position it must tend to assume when the patient is supine. Even then it does not always so lie, for I have found it vertical, or tending to the right in a certain number of cases. I am now investigating this point by altering the position of the abdomen, by placing a rubber cushion under the back, by turning the patient on to the right side, and so forth before the incision is made, and I propose in a few months to disclose the results. At present my opinion is that the position described by Mayo is not the best for the anastomosis to take. In deference to his opinion, than which none more strongly appeals to me, I performed a series of operations making the anastomosis along "Mayo's line," but adopting every other part of the technique of the operation as I described it in my book. I was not pleased with the results. Three of the cases suffered more from bilious vomiting than any I had seen since my early experience. My friend, Mr. Rutherford Morison says the same. He writes me: "I noted with special interest the fact that you had had vomiting after adopting the 'Mayo turn' of the jejunum. My experience was the same. In two cases, after a series of about 50 successes and with practically no vomiting, I adopted Mayo's suggestion. Both cases were more sick than of late years I have been accustomed to see." I have reverted to my original plan of the operation and now place the jejunum almost vertical with a slight, usually an extremely slight inclination to the right. My friend Dr. W. L. Rodman, who honoured me with a visit in August 1907, told me that the operation as I now practise it is the same as that I performed when he was here in 1902, except that I place the jejunum more nearly vertical now than I did then. The results of the operations so performed are quite satisfactory. The mortality now is less than 1 per cent; the after-complications are rarely encountered. Regurgitant vomiting, or the late vomiting of bile, I have certainly not met with in over 200 cases performed by the method I describe. Peptic ulcer has occurred once in a case of duodenal ulcer with intense hyperacidity. My own opinion therefore upon the question of the best form of gastro-enterostomy is in favour of the posterior no-loop method with the almost vertical application of the jejunum to the stomach. But though I firmly hold to this opinion I do not hesitate to say that many of the ill results of gastro-enterostomy, and especially that concerned with the vicious circle, are due not so much to the method practised, as to the absence of any sufficient indication for the operation itself. If the case is a proper one for gastro-enterostomy, the result may possibly be good with any one of several operations, but with the operation I describe and practise the result approaches to certainty.

In duodenal ulcer surgical treatment should always be adopted. The outlook of the patient otherwise is hazardous; the risks of perforation and lethal hæmorrhage, are far more imminent than in cases of chronic gastric ulcer. I have recently operated upon several cases where the ulcer was in an early stage; in three cases in my last 20 it was no bigger than the end of a lead pencil. I have excised one such ulcer, which had bled profusely, and I exposed a "kissing ulcer" on the posterior wall of the duodenum at an exactly opposing point. I therefore removed a part of the duodenum and closing the distal end, I mobilized the duodenum and implanted into the front of the

Fig. 2. Ulcer of the duodenum. Excision of the ulcer.

descending portion the anterior proximal end immediately beyond the pylorus. The appearance of the anastomosis did not please me, and I therefore at once performed gastro-enterostomy as well. But there are I feel sure early cases of duodenal ulcer, where the ulcer is solitary, of small size, and not causing stenosis in which this operation might with advantage be tried. If beyond the pylorus there is half an inch of healthy duodenum before the ulcer is reached, then after removal of the ulcer and closure of the distal cut end, the implantation of the proximal end, with the side of the duodenum rendered mobile by Kocher's method, would leave the action of the pyloric sphincter, unimpaired. The proximal section of the duodenum might be made in such manner that a wide anastomosis with the second portion would result. (See figure.)

I find that I have only twice performed Rodman's operation of excision of the ulcer bearing area of the stomach. I have found gastro-enterostomy to be so simple, easy and safe an operation that I have hesitated to inflict a more serious operation upon these patients. But in all cases where there is doubt as to the simple or malignant nature of the ulcer, and in some where the ulcers are multiple, Rodman's operation is imperatively indicated. I am confident that I ought to have done this operation oftener than I have done; for three cases of what at the time I supposed to be simple ulcer died eventually of malignant disease and the interval between operation and death was such that there is, to say the least, no denying the likelihood of a malignant change having occurred in an ulcer that was simple in its early stage.

If an ulcer occur in the body of the stomach causing an hour-glass condition it may be excised, or gastro-enterostomy may be done on the proximal side of it. The leaving of an undrained pyloric cavity provided the pouch be small in size, does not seem to matter. I have found gastroplasty an unsatisfactory operation on the whole. I performed it 7 times in 30 cases of hour-glass stomach, and two of these cases have needed secondary operations.

When small indurated ulcers are found in the stomach or duodenum I always infold them in exactly the same manner as if they had perforated. In doing so I make a point in my first line of suture of securing the vessels of supply. As was, I think, first shewn by Mitchell of Belfast, the infolding of an ulcer is equivalent to its excision.

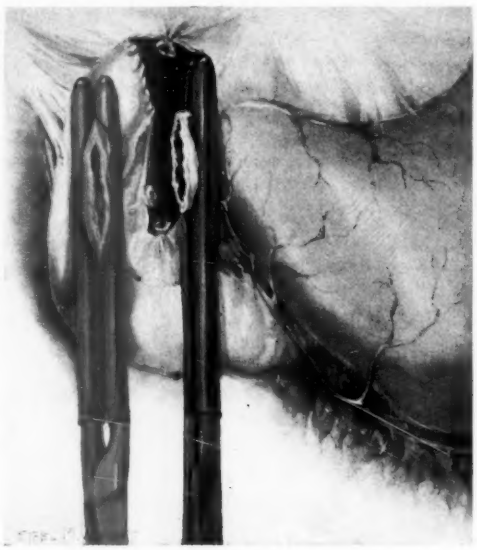

Fig. 3. End to side anastomosis of duodenum after excision of the cylinder bearing the ulcer.

RADIOGRAMS OF SYPHILIS OF THE LONG BONES[1]

By MARTIN W. WARE, M. D.

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SYPHILITIC affections of the bones have been the last of the bone diseases to be subjected to X-ray examinations. Whereas it cannot be claimed that a pathognomonic picture can be obtained in every instance, yet a succession of these radiograms shows a uniformity in the type of the findings which correspond in a striking manner with the gross pathological findings of syphilis of the bones.

We are, therefore, justified in speaking of the "characteristic findings" which, taken in conjunction with the data of the anamnesis, materially add to the certainty of the diagnosis. Furthermore, a prognosis may be based on the radiograms, and the efficacy of treatment estimated by the regressive changes visible in successive radiograms.

As exemplifying a typical finding, mark the circumferential thickening of the periosteum in Fig. 1. It need not follow that the thickening should be circumferential and symmetrical. It may be localized (Fig. 2), and, as is apparent, to a large extent, in all radiograms. In fact, this predominance of the thickened periosteum — aside from other bone changes — stands out conspicuously in favor of syphilis of the bones, as distinguished from other chronic infections of the bone. The interpretation of this shadow is that we have to deal with a gummatous deposit. In some instances this gummatous material encroaches upon the cortex of the bone. In Fig. 3, at some levels it becomes fused with the cortex, materially contributing to the thickening of the bone (Fig. 4). At other levels (Fig. 3), it remains quite distinct. In other instances again (Fig. 6), the intensity of the shadow of the periosteum leads one to infer a deposit of lime salts in the periosteum. On the other hand, translucent areas in the periphery of the bone speak for the destruction of the gumma and bone absorption. If the subperiosteal gummatous deposit be situated in the interosseous space (Fig. 3), its diagnosis would escape detection, were it not for its exposition by a radiogram. Finally, the thickened periosteum may be lifted from the bone beneath, as is visible in Fig. 10, as a fine line.

In the bones we note an increase in their diameter. The distinctions in the shadows perceptible in a normal bone become obliterated; the corticalis appears as a denser shadow, Fig. 1, of wider extent and irregular in its outlines, often encroaching on the medulla to such an extent as to obliterate it (Figs. 6 and 10). This is due to gummatous deposit in the bone. This may be irregularly deposited, giving rise to a striated appearance of the bone (Figs. 3, 10, 11). If, as in the periostitis, this gummatous material breaks down, we have areas of more or less translucency (Fig. 3), surrounded by areas of greater bone activity (osteosclerosis),

Fig. 1. Gumma of the ulna. Circumferential shadow indicating the thickening of the periosteum. Beneath this a denser shadow, being the thickened corticalis.

[1] Read before the Sixth International Dermatological Congress, September 13, 1907.

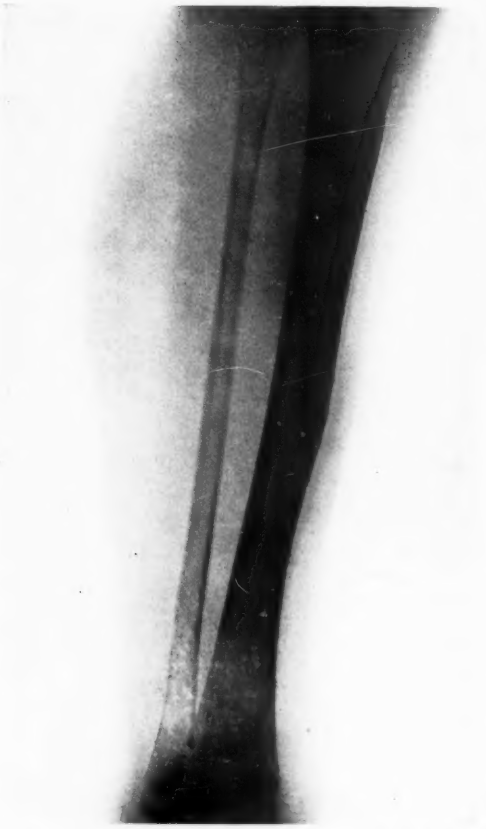

Fig. 2. Gumma of the tibia. A circumscribed shadow of the thickened periosteum.

Fig. 3. Osteomyelitis gummatosa of the ulna. Ulna increased in thickness. Towards the lower end there are shadows of gummatous periostitis. About the center wall well marked translucent areas, due to destructive changes of the gumma. Each area of rarefaction surrounded by a denser shadow indicative of osteosclerosis. Striated appearance of bone due to irregular ossification.

Radius on its ulnar aspect clearly shows the shadow of a periosteal thickening which could not be diagnosticated clinically. Also a bowing of the radius, due to increase of growth in length (Fournier).

which appear as dense shadows. The gummatous deposit of the periosteum in the bone is attended at times by a growth in the length of bones, wherefore a bowing of these bones can be made out (Fournier). This is noticeable in the ulna of Fig. 10, and in the radius of Fig. 3.

Of great service is the use of the X-ray in aiding us to differentiate between a tuberculous and a syphilitic dactylitis. Figs. 5 and 6 strikingly portray the distinctions,— by no means always so easily to be made out. Fig. 6 shows an increase in the thickness of the basal phalanx of the index finger, traceable to some involvement of the soft parts, a greater share due to increase in the diameter of the phalanx surrounded on both sides by a thickened periosteum. In striking contrast to this is the dactylitis of tuberculosis, Fig. 5. A very large extent of the thickness is shared by the soft parts, and the metacarpus is represented by numerous cavities, some communicating, and, judging by the intensity of the shadow, the walls of these cavities and intermediate bone are rather dense. But there is a conspicuous absence of any reaction on the part of the periosteum which is encountered so constantly in all the syphilitic affections.

Fig. 4. Dactylitis syphilitica acquisita. Metacarpus of the index finger is increased in diameter. Medullary canal is encroached upon by the thickened denser shadow of the corticalis (osteosclerosis). Thickened periosteum represented by a slightly lighter shadow than that of the thickened corticalis along the inner aspect near the bone and along the outer margin near the head. Head of metacarpus translucent, due to the absorption of the bone, the picture of osteoporosis.

Fig. 5. Spina-ventosa tuberculosa. Epiphysis of the V. metacarpus has disappeared. Translucent areas (bone absorption) surrounded by dense shadows indicative of residue of the cancellæ. Considerable involvement of the soft parts. Absence of any reaction of the periosteum encountered constantly in syphilis.

In Fig. 10, we have an instance of dactylitis of acquired syphilis, which shows the involvement of the periosteum, the denser shadows of the corticalis of the metacarpus, and a light area in the head of the bone, due to rarefaction.

These are, in substance, the findings in syphilitic affections of the long bones of acquired and late hereditary syphilis. A detailed description of the radiograms follows.

Fig. 1. Female, aged 7 years. One of two surviving children of a family of 8. Other children died within the first year. Aside from this history, there are none of the usual stigmata noticeable in hereditary syphilis. The child complained of a swelling on the forearm, another over the clavicle, and a few weeks later another node appeared over the tibia, Fig. 2.

Under antiluetic treatment they have been diminishing in size. In Fig. 1, there is a circumferential involvement of the periosteum of the ulna, which adds to the thickness of the bone, already increased in its transverse diameter, the denser shadow of the corticalis indicating bone proliferation which has encroached on the medulla.

Fig. 2 shows a circumscribed shadow of the thickened periosteum in the middle third of the tibia, indicating a gummatous deposit.

Fig. 3. *Clinical diagnosis* — Osteomyelitis, gummatous of the ulna.

Mr. S., aged 42, acquired syphilis nine years ago, and notwithstanding persistent antiluetic treatment by Dr. L., with injections of the soluble and insoluble mercury salts and inunctions, he developed osseous lesions of the forearm, elbow, leg, ankle, and cranium.

Radiogram, Fig. 3. The ulna is increased in diameter. Towards its lower end there are the shadows of gummatous deposits of the periosteum. About the center there is a well-marked translucent area, due to destructive changes of the gumma. Above and below are lucid areas of lesser intensity, due to the same cause. Each of these areas of rarefaction are surrounded by denser shadows, indicating sclerotic changes of the bone. In consequence of this, the medulla is obliterated and has a striated appearance, due to irregular lines of ossification. On the ulnar aspect of the radius a periosteal thickening is perceptible, which could not be diagnosticated clinically.

Fig. 8. *Radiogram* of elbow of same. Illumination of patient from flexor surface, in partial extension.

Fig. 6. Dactylitis syphilitica hereditaria. A thickened basal phalanx of the index finger. Epiphysis not involved. Thickened corticalis is represented by a denser shadow sending spiculæ of bone into the medullary canal. The thickened periosteum shows up as a denser shadow, circumferentially surrounding the phalanx. Little involvement of the soft parts, in contrast to Fig. 5.

Articular surfaces of the radius and ulna uninvolved. Lower end of the humerus disintegrated. Structure of the condyles not discernible. Shaft of the humerus likewise devoid of structure, and an increase in the diameter due to thickening of the periosteum. Lower end of humerus presents alternately lighter and darker areas, which respectively represent osteoporotic and osteosclerotic changes. A lateral view of this same joint, Fig. 6, shows the translucent areas of gummatous destruction surrounded by denser shadows of sclerotic changes.

Radiogram, Fig. 10, and of the same patient, shows an obliteration of the medulla of the tibia, due to a thickening of the cortex. A succession of shadows giving the bone a striated appearance, due to irregular lines of ossification. Towards the lower end of the tibia a circumscribed periosteal thickening is visible.

In Fig. 11, the lower third of the tibia and fibula is pictured. Here again, we note a haziness of the inner malleolus, and passing upwards along the inner side of the tibia a thickening of the periosteum appears as a lighter shadow, overlying the denser shadow of the thickened sclerotic corticalis. The fibula about its lower third shows a circumscribed periosteal thickening and an encroachment on the medullary canal, due to thickened corticalis.

Fig. 9. Clinically, no luetic history was obtainable from the parents. The child, eight years of age, was brought to the physician's notice on account of a large swelling of the forearm. This appeared more like a sarcoma, and regarded as such by another colleague, was operated upon. After incision the operation was abandoned, and a piece of tissue removed for microscopic examination. This proved the swelling to be a gumma. Antiluetic treatment from this moment on brought about a reduction of the swelling.

Radiogram, Fig. 9, shows a large light shadow to the inner side of the ulna, dependent on gummatous deposits in the soft parts. To either side of the ulna is a distinct lighter shadow, limited by the fine, dark line of the uplifted periosteum. This is a gummatous periostitis. Another such a node, casting a faint, circumscribed shadow, is also to be seen about the upper end of the ulna, on its inner aspect adjoining the radial head. Then there is the striation in the entire length of the bone, due to irregular lines of ossification, and finally the ulna is found bowed, attributed by Fournier to an increased growth in the length of the bone. A similar bowing is pictured in that of the ulna, Fig. 3.

Fig. 6. *Diagnosis* — Dactylitis syphilitica.

Clinical History. A boy, ten years of age, undersized, head prominent in frontal region, and enlarged veins; teeth very much decayed. One year previously underwent an operation for the removal of assumed tubercular glands in either submaxillary region. The cicatrices, though primarily united, are indurated, and

Fig. 7. Osteosclerosis of the humerus. (Lateral view of Fig. 8.) Shows translucent areas of gummatous destruction surrounded by denser areas of sclerotic changes. In the periphery a defect due to necrosis. The medullary canal is replaced by dense bone.

Fig. 8. Arthritis humeri luetica. Articular surfaces of the radius and ulna not involved. Lower end of the humerus disintegrated. Structure of condyles not discernible. Shaft of the humerus likewise void of structure, and an increase in the diameter due to thickening of the periosteum. Lower end of the humerus presents lighter and darker shadows which respectively signify osteoporosis and osteosclerosis.

Fig. 9. Gumma of the forearm, mistaken for sarcoma. A large light, shadow to the inner side of the ulna, dependent on gummatous deposit of soft parts. To either side of the ulna is a distinct lighter shadow of gummatous periostitis, limited by a fine dark line — the uplifted periosteum, above the upper end of the ulna on its radial aspect. In the entire length of the bone a striation due to irregular lines of ossification, and the ulna is bowed (Fournier), due to an increased growth in length of bone.

the surrounding skin has a coppery-red color. Within the past four months developed a spindle-shaped swelling, starting at the base of the basal phalanx of the index finger. The swelling is tender to the touch.

Radiogram shows a blackened basal phalanx of the index finger. The epiphysis is not involved. The shaft does not present the fine markings of the bone. The corticalis is represented by a thickened line, sending in spiculæ of bone (denser shadows) into the medullary canal. The thickened periosteum shows up as a denser shadow circumferentially surrounding the phalanx. There is little involvement of the soft parts.

Fig. 5. *Diagnosis* — Spina ventosa tuberculosa. No family, parental or collateral, history of syphilis. Within two months in this boy of five years of age a *painful* swelling appeared, involving the fifth metacarpal bone; eventually it perforated. It was very tender. Mother believes a traumatism anteceded the appearance of the swelling.

Radiogram. The epiphysis of the metacarpus has disappeared, and the shaft is represented by a series of translucent areas, bone absorption, surrounded by dense shadows indicative of bone proliferation and residue of spiculæ of the cancellæ. There is considerable involvement of the soft parts, and *an entire absence of a reaction of the periosteum, so conspicuous* in all of the foregoing syphilitic lesions.

Fig. 4. *Diagnosis* — Dactylitis syphilitica, gummatous periostitis and osteomyelitis of the second metacarpus.

History. Female, aged 28; has had this dactylitis for six months or more, and at times a node on the os frontis which disappeared spontaneously. Though married four years she has borne no children, but has

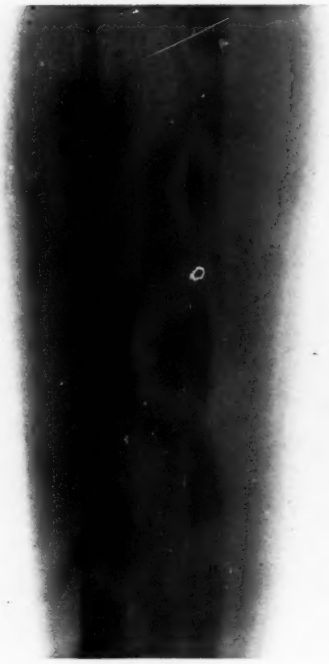

Fig. 10. Osteomyelitis syphilitica of the tibia. Cortex represented by a denser shadow, obliterating the medulla of the tibia. Striated appearance of the bone due to irregular lines of ossification. About the lower end of the tibia the shadow of a circumscribed periosteal thickening is to be seen.

Fig. 11. Osteomyelitis syphilitica of the tibia. Periostitis syphilitica of the fibula. Haziness of inner malleolus due to rarefaction of the bone. Along inner side of the tibia a light shadow (thickened periosteum), overlying the denser shadow of the thickened sclerotic corticalis. The fibula about its lower third shows a circumscribed periosteal thickening and a thickened corticalis encroaching on the medullary canal.

aborted several times. Very recently she developed a subcutaneous gumma over the patella. Up to the present moment she has never had any systematic antiluetic treatment. (See legend, Fig. 4.)

Conclusions. Osteomyelitis, of a chronic nature, dependent on pus organisms, may at times give X-ray pictures which are difficult to differentiate from those of syphilitic origin, which latter, however, are singled out by facts in the history of the case. On the whole, the productive character of the syphilitic inflammation of the bone elements manifests itself in the dense shadows of the radiograms. Gummatous deposits which cause absorption are discernible by the lighter shadows, but most commonly surrounded by the denser shadows of areas of bone consolidation. The atrophy of the bone without reactive changes (consolidation), peculiar to tuberculosis, is wanting in the radiograms. Most characteristic is the shadow cast by the periosteal involvement in syphilis of the bones.

The findings of the syphilitic bones herein described coincide with those of Hahn and Deycke, Köhler, Kienbock, Hochsinger, Ritter.

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A STUDY OF PSEUDOMYXOMA PERITONEI, WITH THE REPORT OF A CASE

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PSEUDOMYXOMA peritonei is the name given by Werth in 1884 to a pathological condition which sometimes arises when the fluid contents of a pseudomucinous cyst-adenoma of the ovary escape into the abdomen and there undergo secondary growth and development, with the production of large masses of thick gelatinous matter, either unorganized and lying free in the peritoneal cavity, or organized and firmly attached to parietal and visceral peritoneum.

The condition is rare, but 56 cases having been found in a rather extensive survey of the literature. As to its frequency, Baldy states he has seen 6 cases in over 6,000 abdominal sections.

Toth (1) states that in 1,700 laparotomies there were noted 4 cases of pseudomyxoma peritonei. At the Gynecean Hospital, in 2,201 abdominal sections the disease has occurred twice, and in 189 operations for ovarian cystomata there have been 2 such cases, or 1.5 per cent.

This disease seems to have attracted much attention, on the continent; many exhaustive papers having been published. In this country the reverse is true, but 4 papers bearing upon the subject being found.

That this lack of data is due, not so much to the rarity of the disease, as to its not being understood by the operator, is the opinion of Hirst (2), who recently reviewed the subject.

The clinical picture of the disease is usually fairly characteristic; a woman usually in late middle life (48 years is the average of the reported cases), who may or may not have been conscious of the presence of an ovarian tumor, notices a fairly rapid enlargement of the abdomen, accompanied by pain and by pressure symptoms, though these latter are more frequently absent. The effect upon the system is variable, cachexia developing rapidly in some cases, while in others there may be no disturbance of health whatever, though there may be enormous quantities of gelatinous pseudomucin free in the peritoneal cavity.

Upon operation there is always found a multilocular cyst-adenoma of the ovary, which has ruptured, evacuating part or the whole of its contents into the abdominal cavity. The cyst contents are usually semi-solid, gelatinous masses, of an amber color, giving the chemical reaction characteristic of pseudomucin, and often very large in amount, as much as one hundred pounds having been removed from one patient.

The peritoneum covering the viscera may be coated with a dense grayish layer of tissue, often so adherent as to make its extirpation impracticable. The appendix is frequently converted into a cyst filled with pseudomucin. The liver, spleen, and especially the intestines are commonly so involved, and the omentum is usually markedly invaded.

The prognosis in these cases is not good. The cachexia so often present, together with the fact that the pseudomucinous exudate is an excellent culture medium for the pyogenic bacteria, render immediate post-operative results most uncertain. Pfannenstiel (3) gives about 50 per cent recoveries. Gunzburger (4) reviews 45 cases with 17 recoveries, or 44 per cent. Bettman (5) in 35 cases reports 18 recoveries, or about 50 per cent. Of all the cases reported 39 recovered, 16 died, and 2 were not noted, a recovery percentage of 69.6 per cent.

Recurrence is almost universal. From the nature of the disease it is impossible to remove every vestige of the pseudomucin, and any particles remaining within the peritoneal cavity may well contain enough of the proliferating epithelial cells to cause renewed growth and secretion. Recurrence is, however, not necessarily fatal, many cases being recorded with two or more secondary operations, and ending in ultimate recovery. Pfannenstiel (3) quotes a case of Fritsch (6) in which the primary operation was performed in 1885, the second in

1886, and 11 years later, in 1897, the patient at this time 66 years of age, was again subjected to laparotomy and relieved of forty pounds of pseudomucin, a cure resulting. The case here reported has had a marked recurrence within two years, and at this date, two months after the second operation, the fluid seems to be again accumulating. The case in detail is as follows:

S. A. W., age 53, a nulliparous widow, was admitted to the Gynecean Hospital, November 14, 1904, on the service of Dr. Baldy, to whom I am indebted for the use of the clinical material. She had always been healthy, menstruation normal, of the 26 day type, and the menopause had supervened ten years before. Her previous medical and family history were not relevant. For four months prior to admission, the patient had noticed a growth in the abdomen, which gave rise to no definite symptoms, caused no pain, and was not accompanied by cachexia. There was a gradual, but steady increase in size, until at the time of admission the abdomen was greatly distended. Upon examination, the patient was found to be a well-nourished woman, with no evidence of organic disease save in the abdomen which was enormously distended with fluid. Vaginal examination revealed a mass on the left of the uterus and posterior to it, with a marked pouting of the vaginal vaults.

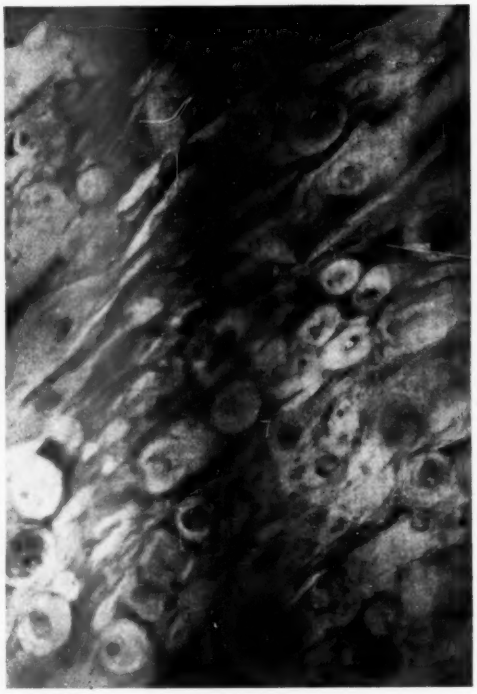
Laparotomy was performed by Dr. Baldy November 17, 1904. When the abdomen was opened, a large amount of semi-solid, gelatinous material poured out. This was removed to the extent of about two gallons.

The omentum was found to be converted into a large quadrangular plate of nodular tissue, composed of myriads of small cysts imbedded in loose connective tissue and bound together with partially organized masses of pseudomucin. The intestines were fairly normal in appearance.

The appendix was transformed into a pyriform cyst of many times the size of the normal organ. The pelvis contained a thin-walled, ruptured cyst-adenoma of the left ovary. This was removed, the abdomen flushed out with normal salt solution, and closed without drainage.

The patient made an uneventful recovery, but in January, 1907, was readmitted with a greatly distended abdomen, and laparotomy was again undertaken. The peritoneal cavity contained three gallons of the characteristic gelatinous tissue, which was densely adherent to all the abdominal viscera and the parietal peritoneum. In many areas distinct organization had taken place, grayish, vascular and nodular masses being intimately related to the surfaces of the intestines, liver, and spleen. These masses bled so profusely on attempting their extirpation, that this was abandoned, and the abdomen again closed without drainage.

The patient convalesced rapidly, but now, four months after the second operation, the abdomen is again filling up, and there is distinct evidence of cachexia.



Pseudomyxoma peritonei. Cells originally lining an ovarian cyst have become transplanted to the omentum and other viscera when they proliferate and divide, forming groups which are distinctly carcinomatous in character.

The specimen obtained from the first operation consists of two plates of omentum, the appendix, and the remains of the ruptured ovarian cyst.

The omental plates were roughly rectangular in shape, the large one measuring 20 by 15 cm., with a thickness of 3 cm., the other somewhat smaller. The tissue is nodular, the nodules consisting of dense, translucent, gelatinous material and an occasional large nodule encysted within a fairly firm, fibrous capsule. The material is pinkish yellow in color, is extremely friable, and is poorly supplied with blood vessels.

Upon section it shows the same general characteristics, with a loose connective-tissue framework, and an occasional large venous sinus running through it.

The ovarian cyst is a mass of tissue, torn and of undeterminable relations, somewhat resembling a placenta. The surface is covered with large and distorted venous surfaces. The tube can be made out as a cord extending 2 cm. beyond one edge of the shredded mass of tissue. The cyst wall cannot be separated from the broad ligament remains. What is apparently the inner surface of the cyst has some remains of gelatinous structures adhering to it in various sized areas.

The appendix is normal at its insertion into the cecum, but at the proximal one-fifth expands into a cylindrical cystic mass. The distal end of the organ is embedded in a mass of the same fibro-gelatinous tissue described above. The surface of the organ is smooth, showing no blood vessels or adhesions. It is thinned out and somewhat translucent. Upon section the appendix has been transformed into a thin-walled cyst containing gelatinous material.

At the second operation there were obtained a few small nodules of grayish tissue, which were removed from the intestinal surface with some difficulty.

Microscopically the ovarian cyst is a true pseudomucinous cyst-adenoma, glandulare. The lining membrane can be indefinitely made out with its tall cylindrical cells. The omental plates show a connective-tissue framework, fairly rich in small round cells and blood vessels. Between the trabeculæ of connective tissue, there is packed thick, amorphous, structureless pseudomucin, with many small cystomata. The cysts contain from one to many cylindrical epithelial cells, similar to those lining the parent cyst. In some instances one cell seems to have secreted sufficient pseudomucin to form a minute cyst, the cell itself forming a central nucleus for the cyst. In others the cells are multiple and have arranged themselves in a single layer, lining the cyst wall.

In a few places complete cysts are found, their lining membrane exactly comparable to that of the ovarian cyst-adenoma.

The specimens removed at the secondary operation do not materially differ from those first obtained, but they are richer in the epithelial cells, which seem to have proliferated to a great degree. The connective-tissue framework, the secondary cysts of various stages of completion, and the amorphous pseudomucin are indentical.

Naturally the chief interest in this condition centers about its pathology and histogenesis. If the reported cases be analyzed, it is found that they may be divided into two great groups — those in which the extravasated cyst contents remained passive in the peritoneal cavity, undergoing no change, but causing a secondary low grade peritonitis, due to the irritation of the foreign substances with the gradual overgrowth of connective tissue and organization of the pseudomucin. This, together with the edema of the peritoneum, caused by the attempt to resorb the thick tenacious matter, gave rise to the term foreign body peritonitis, so steadily used by certain of the observers.

The other group includes those cases in which living active cells of the lining cyst membrane, having been thrown into the peritoneal cavity, have found lodgment and by proliferation formed secondary cystoma, densely adherent to their nutrient base, and continually growing in size and numbers. This differentiation of the process involved led the earlier writers into marked difference of opinion, but in the light of the reported cases all the variation would seem to be part of the same cycle of development. It is easily conceivable that in one group of cases no active epithelial cells escaped at the time of rupture of the cyst, or subsequently, with the natural result that the escaped pseudomucin acted only as a foreign body.

In another group many ovarian cells may have been scattered broadcast throughout the greater peritoneal cavity and given rise to distinct foci of implantation metastases with rapid growth, and showing a morbid anatomy entirely distinct from the first group of cases. Prior to 1884 the disease was not understood at all. The diagnosis was usually colloid cancer or myxomatous degeneration of the peritoneum, a term invented by Virchow (7). The first microscopical examination of the specimens from a case of pseudomyxoma peritonei was made by Menning (8), who concluded that the condition was one of secondary myxomatous degeneration of the peritoneum, caused by the irritation of the cyst contents, thus following Virchow's idea. This view was held until Werth (9) brought out his paper, in which he proved that the disease was not a specific affection of the peritoneum, but the organization of cyst contents, free in the abdominal cavity, which caused a purely reactive inflammation of the peritoneum itself.

Shortly after Werth's studies Baumgarten (10) reported a case in which he showed that following the rupture of a multilocular cyst-adenoma, with the escape of active cells of the lining epithelium of the cyst into the peritoneal cavity, implantation metastases might develop in any situation where the ovarian cells could attach themselves and receive sufficient vascularization to grow and proliferate. This process gives rise to the many secondary cysts which are so characteristic in many cases.

Recently Fränkel (11) has shown that the old view, held by Virchow, that there occurred true myxomatous degeneration of the peritoneum, had foundation, in fact, reported a case in which this change in the peritoneum did

occur, but it must be noted that in Fränkel's case there was not a ruptured cyst-adenoma associated with the peritoneal change, so that it can hardly be considered as being a variation of the typical pseudomyxomatous degeneration.

Nètzel (12) has described a condition which he terms, with Fränkel, myxomatous degeneration of the peritoneum, and which he found in a case showing the other changes of the usual pseudomyxoma peritonei, following the rupture of a thin-walled cyst-adenoma of the ovary.

Pfannenstiel (3), however, points out that Netzel's case was probably one in which an attempt on the part of the peritoneum to absorb the pseudomucin was followed by the choking of the lymph spaces by the gelatinous material, with their subsequent distention, the whole resulting in an edema of the peritoneum, having the appearance of a true myxomatous change.

The older writers almost universally classified cases of pseudomyxoma peritonei as colloid carcinoma, and if the tissue changes in these cases be analytically studied, there is found sufficient basis for this belief. For example, in the above detailed case it is found that the cellular elements lining an ovarian cyst have mechanically been scattered throughout the peritoneal cavity. There they have continued to live. In atypical surroundings they have proliferated, have penetrated connective tissues, and have formed secondary growths exactly comparable to the one in which they were developed. In addition, clinical experience has proven, that though the source of these cells be removed, they continue to grow and produce metastases. Applying the ordinary principles of cancer formation to these facts, it is readily seen that they comply with all the conditions, and the conclusion must therefore be reached that at least those cases, in which the ovarian cyst-cells continue to grow and form secondary cysts after their escape into the abdomen, must be considered as belonging to the carcinoma group, particularly the so-called colloid cancer.

From the foregoing study of this subject the following conclusions may be drawn:

1. The foreign body peritonitis of certain observers, pseudomyxoma peritonei, and secondary myxoma of the peritoneum are different stages or phases of one and the same condition.

2. That the disease depends per se upon the presence of a ruptured multilocular cyst-adenoma of the ovary.

3. That it is a dangerous disease, both as to immediate post-operative results, and also by reason of its tendency to recurrence and to the development of cachexia.

4. That inasmuch as it histologically corresponds accurately with the processes of cancer formation, pseudomyxoma peritonei must be regarded as a form of carcinoma.

The following is a brief of the reported cases:

1. Lapthorn Smith (13). Age of patient not noted. Tumor noticed two months before, large as a six month's pregnancy. Laparotomy revealed a ruptured cyst-adenoma glandulare of the left ovary. The abdomen contained two gallons of gelatinous tissue. The intestines were dull, but not roughened, and were covered with areas resembling fatty degeneration. Recovery.

2. Bettmann (5). H. W. A woman 65 years of age. Ruptured cyst-adenoma of right ovary. The abdomen was filled with gelatinous matter, adherent to the viscera. Death from sepsis.

3. Uspensky (14). A 2 para of 50 years. Tumor noted in abdomen for two years. On operation there was found a ruptured, right-sided, multilocular cyst-adenoma of the ovary. The abdomen was filled with colloid material, with marked invasion of the omentum. Death from sepsis.

4. Geyl (15). A widow of 76 years. Tumor of one year's growth, abdomen filled with topaz-colored, jelly-like material. Large thin-walled, ruptured, multilocular cyst-adenoma of the left ovary. A dirty gray deposit was attached to all abdominal organs and could not be removed. Patient died after six months.

5. Runge (16). A woman, 40 years old, had noticed an abdominal tumor growing for five months. On operation there was found a ruptured right-sided ovarian cyst-adenoma. The omentum and bladder walls were filled with small cysts. A large amount of gelatinous tissue was removed from the abdomen. Recovery.

6. Case 2d. Age not stated. A large, ruptured, multilocular ovarian cyst, with a large amount of gelatinous fluid in the peritoneal cavity. No secondary cysts. Complete recovery, without recurrence.

7. Korn (17). A nulliparous woman of 48 years. Five years previously she had a left-sided ovarian cyst removed. At present operation a large, ruptured, right-sided cyst-adenoma. The peritoneum was much injected and filled with masses of gelatinous matter. Recovery.

8. von Swiecicki (18). A woman, 54 years old, 1 para. The tumor was of six months' growth. On

operation a large, ruptured, left-sided cyst-adenoma. The peritoneal cavity was filled with gelatinous material. There was no evidence of cyst formation, but marked ecchymosis of the peritoneum. Recovery.

9. Donat (19). A woman of 38 years, 3 para. A large ovarian cyst-adenoma, ruptured on its posterior surface. The cyst wall, peritoneum, and intestines were covered with deposits of grayish material. This showed ecchymotic areas and partly formed blood vessels. A large amount of gelatinous tissue was removed from the abdomen, but no secondary cysts were discovered. Recovery.

10. Gunzburger (4). Age not stated. A ruptured cyst-adenoma of right ovary, with a dermoid on the left side, and another small dermoid on the right. Recovery.

11. Case 2d. A woman, 40 years of age. A pseudomucinous glandular cyst of right ovary. Four months later recurrence with an enormous quantity of pseudomucin free in the abdominal cavity. Recovery.

12. Tauffer (22). A woman, 43 years of age. A thin-walled pseudomucinous ovarian cyst, ruptured. Peritoneum entirely covered with a soft adherent gelatinous mass 3–4 m.m. in thickness. Recovery.

13. Case 2d. A woman, age 51 years. Bilateral pseudomucin cysts, one ruptured, peritoneum filled with gelatinous masses. Recovery.

14. Kezmarsky (20). A woman, 35 years of age. Large multilocular ovarian cyst, with thin walls, but no apparent point of rupture. The entire peritoneum covered with gelatinous masses, which were densely adherent to it. Peritoneum greatly congested. Recovery.

15. Reuder (21). A woman, 27 years old, noticed tumor in abdomen for 3 months, with pain. Upon operation, the pelvis was filled with small cysts, tumors all greatly inflamed and densely adherent. The abdominal cavity was filled with gelatinous material, which was removed, although the pelvic tumor could not be, by reason of hemorrhage. Recovery.

16. Tillman (23). Ovariotomy for cysts. One year later, second operation with discovery of colloid carcinoma of ovary, pelvis, omentum, and intestines. Death.

17. Westermark and Annell (24). A woman, 52 years old, 5 para. Tumor growing many years, right-sided glandular cystoma, densely adherent to surrounding structures. Masses of gelatinous tissue in peritoneal sac. Death.

18. Fränkel (11). A woman, 51 years old. Large right-sided ovarian cystoma, with jelly-like masses free in the abdominal cavity. Peritoneum and intestines covered with small cysts. Patient was operated upon four times in 3 years and finally died of cachexia. On autopsy, all organs were densely coated with grayish gelatinous material.

19. Gottschalk (26). Right ovary cystic, left ovary, tube, and peritoneum thickly covered with masses of pseudomucin. Recovery.

20. MacDonald (27). A woman, 44 years of age. Six months' growth. Ruptured right ovarian cyst. Peritoneum filled with gelatinous material, 20 pounds being removed. Recovery.

21. Case 2d. A woman, 58 years old. Tumor noticed one year. Right ruptured multilocular cyst. Peritoneum filled with jelly. In relation to intestines on right side, a dense cyst. Recovery.

22. Ratschensky (28). A woman, 60 years of age, noticed a tumor for 8 years. Upon operation, double ruptured multilocular ovarian cyst was found. Abdomen was full of jelly. Death.

23. Kretschmar (29). A woman, aged 52 years. Tumor noticed for two weeks. Abdomen filled with fluid. Appendix thickened. Right ovarian glandular cyst, ruptured. Death from sepsis.

24. Case 2d. A woman, 59 years of age, noticed tumor for six weeks. Right ovarian cyst, ruptured. Abdomen filled with jelly. Recovery.

25. Case 3d. A woman, 45 years of age. Double ovarian cysts, ruptured. Abdomen full of jelly. Peritoneum much injected and thickened. Recovery.

26. Beinlich (30). A woman, 54 years old. Growth of long duration. Upon laparotomy masses of thick jelly-like fluid, weighing 25 pounds, escaped. The cyst sprung from the right ovary. Drainage, death in 3 days.

27. Case 2d. A woman of 26 years, 2 para, had noticed during her second pregnancy much pain in abdomen, which continued after delivery and culminated in the discovery of a large vague abdominal tumor. On section, an ovarian cyst was found together with 30 pounds of jelly-like tissue scattered throughout the abdomen. Death resulted from shock.

28. Polano (31). A woman, 66 years of age. Left ovarian cyst-adenoma pseudomucin, large masses of pseudomucin free in the abdominal cavity. Two years later cyst developed in right ovary, ruptured. On section, abdomen filled with jelly-like mass. Small nodules densely adherent to intestines. Death from ileus. The epithelial cell had invaded the capsule of Glisson and had formed small metastatic cysts within the liver parenchyma, closely simulating cancer.

29. Mond (32). A woman, 50 years of age, with large tumor in abdomen. On section a myoma of the uterus was found, a large ruptured cyst-adenoma of the ovary, and the abdomen filled with gelatinous fluid which was removed and weighed 14 pounds. Death.

30. Lewitzky (25). Large multilocular cyst of right ovary, with spontaneous rupture. On section a bloody, gelatinous fluid was found in abdomen. Peritoneum thickened, hemorrhagic, and covered with small cysts filled with colloid tissue. The omentum covered with colloid cysts. Recovery.

31. Case 2d. Age of woman not noted. Abdomen filled with pseudomucin which sprung from a ruptured ovarian cyst, which was twisted two and one-half times on its pedicle. There were many small cysts scattered throughout the abdomen, and the omentum was greatly enlarged and contained many small cysts.

32. Brakesch (33). A woman, 62 years of age. Tumor noted three months. Upon operation, a left-sided, thin-walled, ruptured cyst-adenoma of the ovary. Abdomen was filled with greenish colloid material. Recovery.

33. Menning (8). A 46-year-old woman, who had borne nine children, had for several years noticed a swelling of the abdomen with marked menorrhagia. Upon section there was found a thin-walled, ruptured ovarian cyst, the peritoneal cavity being filled with jelly-like fluid which was firmly attached to the intestines and the other abdominal viscera. Ovariotomy, and death from shock.

34. Werth (9). Woman, 37 years old, 2 para, for some years had attacks of abdominal pain, for seven weeks marked enlargement of the abdomen. On section there was found a fist-sized pseudomucinous cyst of the ovary, without apparent rupture. The abdomen was filled with pseudomucin, partly free and partly attached to the viscera. The omentum was much injected and densely adherent to tumor. Convalescence uneventful, but sudden death three months later from pulmonary embolus.

35. Netzel (12). A spinster of 44 had noticed for one year a rapidly growing abdominal tumor, with pain and discomfort. Laparotomy was performed, with the removal of large quantities of gelatinous matter, a cure resulting. No mention is made in this case of finding of an ovarian cyst.

36. Neubauer (34). A woman of 46 years of age, 13 para. Swelling in abdomen of long duration. On section, abdomen filled with yellow, gelatinous fluid and a right ovarian cyst of adult-head size. Intestines and omentum infiltrated with pseudomucin. Recovery.

37. Strassmann (35). A woman of 28 years, 2 para. Tumor in abdomen for 8 months, last few months of very rapid growth. On section there was found a huge ruptured ovarian cyst from which poured pseudomucin and dermoid matter, hair, teeth, etc. The tumor could not be entirely removed, and the sac was accordingly attached to the abdominal wall. Death in six days. Upon autopsy there was found another pseudomucinous cyst on the cul-de-sac of Douglas.

38. Olshausen (36). A 40-year-old woman, 3 para. Patient had previously had one ovarian cyst removed. Two years later the abdomen began to swell, and on section there was found a left-sided ovarian cyst with a large amount of pseudomucin lying free in the abdominal cavity. Recovery.

39. Hofmeier (37). Age not given. A ruptured, pseudomucinous ovarian cyst was removed with large masses of gelatinous material free in the abdominal cavity. Recovery.

40. Reh (38). A 62-year-old woman, 9 para. Bilateral ovarian cysts, with pseudomucin free in the abdomen. One cyst removed, the other left by reason of adhesion to bowel. One year later, herniotomy with removal of the other cyst and large amount of pseudomucin. Recovery.

41. Case 2d. A 59-year-old woman, 3 para, with a rapidly growing abdominal tumor. On section, a large left multilocular ovarian cyst, with a smaller cyst on the right side. Abdomen filled with gelatinous matter, lying closely enfolded between the folds of intestines. Recovery.

42. Goette (39). A parous woman of 33 years. Upon laparotomy a right-sided, ruptured ovarian cyst was removed. Large masses of pseudomucin were scattered throughout the abdomen and were densely adherent to the intestines and to the parietal peritoneum which was 5 m.m. in thickness. Recovery.

43. Case 2d. A 75-year-old woman, 2 para, with an abdominal growth of one year's duration. On section there was found a large, ruptured left-sided ovarian cyst, with quantities of gelatinous matter free in the abdomen and adherent to the intestines, parietal peritoneum, and omentum which was greatly thickened. Recovery.

44. Hirst (2). A nulliparous woman of 50 years had noticed some abdominal enlargement for six months, together with complete prolapse of uterus and vagina. On section there was found 15 pounds of pseudomucin free in the peritoneal cavity, with a semi-collapsed, ruptured, left ovarian cyst. Two daughter cysts were found in the wall of the ileum. Recovery.

45. Wendeler (40). A woman of 53 years. There was found a ruptured, right-sided ovarian cyst. The abdomen was filled with gelatinous material. Recovery.

46. Lauwers (41). A woman of 40 years was operated upon for a large, thin-walled, multilocular ovarian cyst which ruptured during pregnancy operation. Attempts were made to remove all the pseudomucin, but three months later an enormous collection of pseudomucin was removed from the peritoneal cavity. Recovery was uneventful.

47. Case 2d. A girl of 24, who had a multilocular cyst of the ovary removed, returned three months later with a large collection of pseudomucin in the peritoneal cavity. Operation was followed by death.

48. Case 3d. A woman of 71 years. Section for large, thin-walled ovarian cyst with several smaller tumors in the peritoneum. Recovery.

49. Peters (42). A woman of 28 years, 1 para, noticed a growth in abdomen for five years. Upon section there was found a bilateral multilocular ovarian cystoma, with much gelatinous matter free in the peritoneal cavity. The pseudomucin was densely adherent to the intestines, and the omentum was markedly invaded. Recovery.

50. Case 2d. A woman of 37 years, 3 para, had noticed a growth in abdomen for nine months, together with some pain. Upon section there was found a thin-walled multilocular ovarian cyst, with an area of rupture on its posterior aspect, and a small right-sided ovarian cyst. The abdomen was filled with pseudomucin. Death from embolus.

51. Case 3d. A woman of 48 years, 2 para, noticed a painful tumor in abdomen for one year. On section there was found a large amount of gelatinous fluid, free in the peritoneal cavity, a ruptured multilocular cyst of the left ovary, with the omentum and intestines markedly invaded with pseudomucin. Recovery.

52. Case 4th. Patient was a woman of 62 years, 4 para. On operation there was removed a large, ruptured, right-sided, multilocular ovarian cyst. The abdomen was filled with pseudomucin, but there was no invasion of tissue. Recovery.

53. Santlus, Theo. (43). A woman of 47, 1 para. Tumor noticed for 3 weeks. On section there was

removed a ruptured, left multilocular ovarian cyst. Abdomen was filled with pseudomyxoma which infiltrated the intestinal wall and the omentum. Death.

54. Case 2d. A 64-year-old woman, 5 para. Tumor noticed for 2 years. On section removed a left-sided multilocular ovarian cyst. Abdomen filled with jelly-like material. Numerous small cysts attached to intestines, parietal peritoneum and omentum. Recovery.

55. Case 3d. A woman of 57 years, 2 para, had noticed a swelling of the abdomen for 3 months. On section an intraligamentary, right-sided, ruptured ovarian cyst was found. The abdomen was filled with jelly-like material. Recovery.

56. Case 4th. A 63-year-old woman was operated upon for pseudomyxoma peritonei, and reoperated on one year later for recurrence. Bilateral ovarian cysts removed with a large quantity of pseudomucin. Recovery

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PANCREATIC DIABETES

With Remarks upon Its Surgical Treatment

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MORE has probably been written upon the pathology and treatment of diabetes than upon any other subject in the whole range of medicine, but until recently no theory of its causation has been advanced that could reasonably be held to apply to even the majority of cases. This lack of any guiding principle on which a rational system of therapeutics could be founded has resulted in the treatment being largely confined to more or less irksome dietetic and hygienic measures which, at best, but serve to stay the progress of the disease for a time. Any explanation therefor of its etiology which can be shown to apply to the majority of cases and give promise of a more radical and lasting means of combating the disease, or, better still, of detecting the cause and treating it before the onset of the characteristic symptoms, is to be heartily welcomed. This, I hope to prove, is most satisfactorily supplied by the pancreatic theory.

From 1858, when Bernard discovered the fact that puncture of the floor of the fourth ventricle, in the neighborhood of what we now know is the vasomotor centre, produced glycosuria the nervous theory of diabetes held the field, and it was not until the classical experiments of von Mering and Minkowski on the results of the extirpation of the pancreas were published in 1889 that it was seriously challenged. These observers found that excision of the pancreas in dogs and other animals gives rise to a condition comparable in every way to diabetes as seen in man. Usually within twenty-four hours of the operation the urine is increased in quantity and contains a gradually increasing amount of sugar, which reaches a maximum of 8 to 10 per cent about the third day after the operation. Although the animals eat and drink voraciously, they rapidly lose strength and flesh, death occurring about the fourth week from inanition, even when they are not previously carried off by lung disease or complications arising from the invariable disinclination of the wound to heal. Shortly before death, and when the animals are too weak to move about, the sugar usually begins to diminish, and acetone, diacetic acid, and oxybutyric acid make their appearance in the urine. Finally in some cases the glycosuria altogether ceases. The excess of sugar in the blood and urine in puncture diabetes comes from the stored glycogen in the liver, for if the hepatic vessels are first ligatured, or the animals have been starved and exercised so that the liver glycogen is reduced to a minimum, no glycosuria results from the operation. In the diabetes produced by removal of the pancreas, on the other hand, although the glycosuria is in part dependent upon the glycogen of the liver, this is not the only source, for in starved and exercised animals extirpation of the pancreas still gives rise to glycosuria, and the amount of sugar in the urine is found to bear a constant ratio to the nitrogen excretion of about 2.8 to 1, suggesting that sugar is being formed from albumen within the body and that the total quantity so formed is being excreted unutilised, corresponding in this respect to the condition met with in severe human diabetes. That the glycosuria in these animals is dependent neither upon the injury to neighbouring structures nor upon absence of the digestive ferments of the pancreas from the intestine is shown by the fact that implantation of pancreatic tissue beneath the abdominal wall is capable of preventing the appearance of sugar in the urine so long as it retains its normal structural character.

Previous to 1889 isolated instances in which diabetes had been noticed to be associated with disease of the pancreas had been recorded from time to time, but no special importance was as a rule attached to the pancreatic lesions, and the disease was usually regarded as being dependent in such cases upon implication of the neighbouring sympathetic ganglia. Thus, as early as

1788, Cawley described in the London Medical Journal a case of diabetes with atrophy of the pancreas and numerous calculi in the ducts. Chopart published a similar case in 1821, and Bright in the Medical Association's Transactions for 1833 gave an account of a diabetic with jaundice and fatty stools, the head of whose pancreas was found post-mortem to have been converted into a hard nodular tumour firmly adherent to the duodenum. Further cases were subsequently published by other observers, but in spite of these such an authority as Cohnheim concluded that all pancreatic changes met with in diabetes were either accidental or secondary complications. When the experiments of von Mering and Minkowski demonstrated the direct relationship of the pancreas to the internal carbohydrate metabolism of the body, and its independence alike of the external secretion of the gland and of its nervous connections, fresh interest was aroused in the condition of the pancreas in diabetes and a number of observers published statistics bearing on the point. Among the earliest of these were the investigations of Windle who reported that in 139 cases of diabetes the pancreas had been found to be diseased in 74, or 53 per cent. Seegen, however, who analysed the records of 92 cases stated that a pancreatic lesion had been noticed in only 17 (19 per cent), while Frerichs found disease of the pancreas in 16 out of 44 cases of diabetes (36 per cent). Hansemann again reported a much higher percentage of pancreatic lesions, 74 per cent, in the cases of diabetes examined after death in the Berlin Pathological Institute. Bloch collected 22 cases from the records of the Vienna General Hospital and found that in 12 (55 per cent) the pancreas had been recognized as abnormal. Williamson in his work on Diabetes Mellitus, published in 1898, gives an account of 23 cases in which special attention was paid to the condition of the pancreas and states that in 15 of these (79 per cent) there was evidence of disease. These widely divergent results are no doubt to a great extent to be explained by a difference of opinion as to what is to be regarded as normal and what as pathological, and it is apparent from a study of the published records that the more carefully and systematically disease of the pancreas has been searched for in cases of diabetes the more frequently has it been found.

The use of the microscope by recent observers has considerably increased the proportion of cases in which lesions of the pancreas have been discovered in association with diabetes, and this has been particularly marked since attention was drawn to the probable relationship of the islands of Langerhans to internal carbohydrate metabolism. It is not my intention here to discuss the structure and supposed functions of these characteristic groups of cells, but those who wish for an impartial summary of the evidence for and against the contending views that are held with regard to them will find a full account in a recent work by Mr. Mayo Robson and myself on "The Pancreas, Its Surgery and Pathology," published by Saunders & Co. I may state, however, that personally I am of opinion that the balance of available evidence strongly points to their being independent structures related to the control of carbohydrate metabolism that the pancreas undoubtedly exerts. Opie, who made a histological examination of the pancreas in 19 cases of diabetes, found evidence of disease in all but 4 (i. e. in 79 per cent), and Bosanquet, who also examined a similar number microscopically, found lesions of the pancreas in 17, or 90 per cent. It is noteworthy that in 4 of Opie's cases no gross abnormality could be detected, and it was not until they were submitted to microscopical examination that the disease was discovered. Most of the published cases in which the condition of the islands of Langerhans is reported have been collected by Sauerbeck, and he found that in 117 out of 157 (74 per cent) there was some abnormality. If the quantitative changes, which as Opie and others have suggested may be of importance in the diabetes of children and in hereditary cases, are excluded there remain 98, or 62 per cent, in which qualitative changes were observed. It is therefor probable that in somewhere about three quarters of the cases of diabetes a careful examination of the pancreas will reveal evidences of disease, and it is to these that the inability of the tissues of the body to deal with carbohydrates is to be attributed.

One great stumbling block in the way of the ready acceptance of the pancreatic theory of

diabetes has been the very frequent occurrence of lesions, and often very marked lesions, of the pancreas without glycosuria, but if we accept the view that the islands of Langerhans are concerned in the elaboration of the hypothetical internal secretion and that so long as they are intact carbohydrate metabolism will not be interfered with, this difficulty is met, for experiments upon animals and observations on the human subject have shown that fibrosis of the gland, fatty degeneration, etc., may involve the secreting parenchyma to a remarkable degree and yet leave the cell-islets unaffected. A very striking example of this has recently been investigated and described by S. G. Scott. The patient was a man suffering from cancer of the head of the pancreas with occlusion of the duct and secondary atrophy and fibrosis of the body of the gland. There was no trace of sugar in the urine during life, and although post-mortem microscopical examination showed that the whole of the secreting parenchyma had been replaced by fibrous tissue, there were numerous cell-groups, having the appearance and characters of normal islands of Langerhans embedded in it.

It is obvious, I think, even from the foregoing brief and imperfect summary of the evidence bearing upon the pancreatic theory of diabetes, that disease of the pancreas is responsible for a considerable number of cases, and although we are at present unable to fix the exact proportion, it is probable that at least 75 per cent can be so explained. There are some who suggest a still higher figure, and a few who claim that all cases of diabetes are of pancreatic origin, but, while agreeing that there may be fine histological and chemical changes which we are unable to detect by the methods of investigation at present available, I think there is both clinical and experimental evidence to show that the pathology of all cases of diabetes is not the same and that some at least are to be referred to other causes. If this is so, the difficulty then arises of distinguishing clinically between the pancreatic and non-pancreatic cases. Lancereaux, in 1877, claimed that diabetes associated with disease of the pancreas was always accompanied by marked wasting (diabète maigre) and was further characterised by the brusqueness of its onset, the gravity of the symptoms, and the rapid progress of the disease, while that in which there was no marked loss of flesh (diabète gras) and that ran a longer and more benign course was due to some other cause. Although it is true that some cases of pancreatic diabetes do run a rapid course and are exceedingly grave from the first appearance of the symptoms, this, in my experience, is rather the exception than the rule. I have had the opportunity of investigating a number of cases of diabetes of undoubted pancreatic origin in which there has been no marked loss of flesh, the onset had been insidious, and the general health is good several years after the discovery of the glycosuria. It is now generally acknowledged that as a rule the character of the onset and symptoms afford no evidence on which a reliable opinion can be based as to the origin of the disease. Must we conclude therefore that it is practically impossible to distinguish these two classes of cases except in the deadhouse? I think not, for by examining the urine by a modification of the method I have described for detecting active degenerative changes in the pancreas, under the name of the "pancreatic reaction," it is possible I believe to make a correct diagnosis in the majority of cases, and so give the patient, in many instances, a much better chance of cure than if he is treated only on the old empirical lines.

The "pancreatic reaction" was first described in my Arris & Gale lecture at the Royal College of Surgeons in 1904 (Lancet, March 19, 1904). In 1906 I published an improved method (Brit. Med. Journ., May 19, 1906) by which most of the defects of the original test were overcome and the result was, to a large extent, made independent of the experience of the observer. I have now examined over 800 specimens of urine by this method and found evidence of disease of the pancreas in all cases where a positive result was obtained and it was possible to subsequently examine the condition of the gland. In cases of pancreatitis that have been operated upon it has been found that the reaction became less marked as the patient recovered, and finally disappeared with his return to health. I have never obtained a positive reaction with a normal urine, nor in any case in which it was not

probable that there was some pancreatic mischief. Felix Eichler (Berl. klin. Wochenschr., 1907, Nr. 25) has recently published some experimental work which confirms my clinical results. After satisfying himself that the urine of normal human beings, dogs, rabbits, and guineapigs gave no reaction, he produced acute pancreatitis artificially in three dogs and found that in each instance the urine then gave a characteristic "Cammidgesche Pankreas-Reaktion." It is therefore obvious that since this reaction is apparently characteristic of disease of the pancreas of a degenerative character, its application to cases of diabetes may help to solve the problem of diagnosing pancreatic from non-pancreatic cases.

Taking advantage of the fact that the reaction is due to a substance having the characters of an unfermentable pentose, the following modification has been devised and employed for examining the urine from cases of diabetes, with a view to determining whether the glycosuria is associated with active degenerative changes in the pancreas or not.

After the usual qualitative and quantitative examinations have been made a carefully filtered specimen of fresh urine is taken, and 40 c.c. mixed with 2 c.c. of strong hydrochloric acid (sp. gr. 1.16) in a flask fitted with a funnel condenser. The mixture is gently boiled on a sand bath for ten minutes, cooled in running water, and the contents of the flask made up to 40 c.c. with distilled water. The excess of acid is then neutralized by slowly adding 8 grammes of lead carbonate. After standing for a few minutes the flask is again cooled and the contents filtered through a moist, close-grained filter-paper. The filtrate is well shaken with 8 grammes of powdered tribasic lead acetate, and the resulting precipitate removed by careful filtration. The lead in solution is now removed by passing a stream of sulphuretted hydrogen through the liquid for several minutes and filtering off the precipitated lead sulphide. The resulting clear liquid is next incubated at 37° C., to drive off the greater part of the dissolved gas, and when this has been accomplished, is carefully neutralised with decinormal sodium hydrate solution. After being diluted with an equal volume of distilled water, it is mixed with a small quantity of fresh cake ("German") yeast and incubated at 37° C. to remove the fermentable sugar. At the same time a control specimen, which has been treated in exactly the same way, save that it has not been boiled with hydrochloric acid, is placed in the incubator, and from time to time samples of this are taken, filtered, and tested for sugar by Kowarsky's method (Eulenburg's Lehrbuch der Klin. Untersuchungsmethoden, bd. i, s. 80). When crystals of glucosazone can no longer be obtained, the original specimen is cooled, filtered, and 20 c.c. of the filtrate mixed with 0.8 grammes of phenylhydrazin hydrochloride and 2 grammes of powdered sodium acetate contained in a small flask, fitted with a funnel condenser. The mixture is boiled on a sand bath for ten minutes and then filtered hot, through a filter paper moistened with hot water, into a test tube provided with a 15 c.c.-mark. Should the filtrate fail to reach the mark, it is made up to 15 c.c. with hot distilled water and stirred with a glass rod. After standing for 24 hours undisturbed the test tube is examined, and in cases of pancreatic diabetes a more or less well marked deposit of crystals will be found. Under the microscope these are seen to be small fine, light yellow, flexible sheaves, which when irrigated with 33 per cent sulphuric acid melt away and disappear in 10 to 15 seconds after the acid first touches them. On being collected and purified by recrystalisation they are found to melt at about 160° C. They can be distinguished from glucosazone crystals by their appearance under the microscope, their ready solubility in 33 per cent sulphuric acid, and their melting point.

I have examined 83 specimens of urine from 48 cases of diabetes by this method and obtained a positive result, suggesting that the diabetes was probably of pancreatic origin, in 36 (75 per cent) of the patients. In 12 no reaction was obtained. Of the 12 whose urine gave no reaction two were children, and when the pancreas of one of these was examined post-mortem no abnormality could be discovered, either microscopically or macroscopically; the pancreas of the other was not examined after death. Two others in this group were also examined post-mortem and the pancreas was said to be normal. My observation of the 36 cases that gave a positive reaction has

led me to divide them into three classes. 1. Those in which there was pancreatic mischief, probably secondary to some morbid influence reaching the gland by way of the ducts. 2. Those probably secondary to blood diseases or circulatory disturbances. 3. Those in which the diabetes was induced by destruction of the pancreas by malignant disease, either primary, or a secondary invasion from neighbouring organs. I have had 19 cases belonging to the first class. In 3 of these the glycosuria followed an attack of acute or subacute pancreatitis from which the patient recovered, and 16 were due to chronic inflammation of the gland, secondary in 6 instances to the presence of gallstones in the common duct, to an ascending duodenal catarrh in 8, and associated with the presence of pancreatic calculi in 1, and with a cyst of the pancreas in 1. Seven cases were diagnosed as belonging to the second class, in 5 of these there was arterio-sclerosis, 1 was probably syphilitic, and the seventh was found post-mortem to have interacinar pancreatitis, a disease probably due to some unknown blood condition. Of the 48 cases of primary malignant disease of the pancreas that I have examined I have only met with the sugar in the urine of 2, and both of these gave the modified "pancreatic reaction". In two cases of extension of a malignant growth from a neighbouring organ (cancer of the duodenum in one, and cancer of the common bile duct in the other,) I have also found sugar in the urine and obtained a positive "pancreatic reaction". Two of these 36 cases have been examined post-mortem, in one there was well marked interacinar pancreatitis, and in the other advanced fibrosis of the pancreas with calculi in the ducts.

The satisfactory results obtained by the administration of thyroid preparations in myxoedema and cretinism have naturally suggested that extracts, or preparations, of pancreas might be equally effectual in the treatment of pancreatic diabetes. In a few cases it has been claimed that some amelioration of the symptoms has been produced in this way, and I have personally had the opportunity of investigating 2 cases where decided benefit followed the administration of an emulsion of fresh pancreas twice daily. In the majority of cases, however, no marked benefit results, and in those where some improvement occurs it is probably due rather to the effects of the pancreatic preparation on the digestion than upon any influence that it exerts upon internal carbohydrate metabolism. Subcutaneous injections have been employed, but with no satisfactory results, and the subcutaneous implantation of the pancreas of the lower animals, in the few cases where it has been tried, has proved to be equally unsatisfactory as a therapeutic measure. Basing their treatment on the effects of secretion as a stimulant of the pancreas, Moore, Edie, and Abram have made use of an acid extract of duodenal mucous membrane in diabetes. They state that in some cases a gradual diminution of the sugar has been brought about and that in a few it has finally disappeared. Other observers, however, deny that the treatment of itself produces any improvement in the symptoms and attribute the results observed to the diet and hygienic measures adopted. This method of treatment is as yet in too early a stage of trial to make any definite statements as to its real efficacy in genuine cases of pancreatic diabetes, but, even should it be eventually proved that an acid extract of intestinal mucous membrane can exert some influence in controlling glycosuria, it is questionable whether in the end it may not do more harm than good, for the artificial stimulation of the diseased pancreatic tissue, although it may at first produce increased activity, is likely in the end to bring about fatigue and more rapid degeneration than if the work of the gland had been kept at the lowest possible limit by diet and physiological rest alone. Cohnheim's work upon the effects of a mixture of pancreatic and muscle extracts on glycolysis has suggested the use of such a mixture in diabetes, but this too is as yet in an experimental stage.

Whether it will eventually be found possible to treat pancreatic diabetes successfully by one or other of the methods mentioned, or further experiment will reveal some altogether different line of treatment, it is impossible to say. but at present advanced diabetes, whatever its origin, is impossible of cure and can only be controlled along the lines that experience has indicated. It is far otherwise in the early

stages of the disease, and in what one may term the pre-glycosuric condition, when those degenerative changes in the pancreas which may eventually interfere with, and destroy, its power of controlling the metabolism of carbohydrates within the body are but commencing. So long as the etiology of many lesions of the pancreas was obscure and their diagnosis a matter of extreme difficulty, little could be done to deal with them before they had advanced to such a stage that the functions of the gland were hopelessly impaired, but now that we can readily detect the presence of degenerative changes by means of the pancreatic reaction in the urine, and a consideration of the clinical history and symptoms, together with the results of a careful examination of the urine and faeces, will usually serve to throw light on the cause of the condition, there can be no reasonable excuse for allowing the disease to progress undiagnosed and untreated until diabetes supervenes.

My object in dividing cases of pancreatic diabetes into three classes has been to make clear their etiology and so open the way for earlier and more radical treatment. In the first class, namely those in which the pancreatic mischief is secondary to some morbid influence reaching the gland by way of the ducts, there is usually a long antecedent history of "dyspepsia" or gastro-intestinal trouble, probably indicating a duodenal catarrh, or of attacks of jaundice of the "catarrhal type," or of gallstones. The progress of the disease is slow, and it is not until the pancreatic lesion has reached an advanced stage that glycosuria occurs. I have met with cases in which this was shown by several years intervening between the discovery of the pancreatitis and the appearance of sugar in the urine. One patient who was operated on by Mr. Mayo Robson twelve years ago for gallstones, did not develop glycosuria until eight and a half years afterwards. In another the symptoms of diabetes came on four years after an exploratory operation for what was believed to be cancer of the pancreas. At the time these operations were performed chronic pancreatitis and its possible consequences were not fully recognized, but had means been taken then to stay its progress it is quite likely that a cure, which is now impossible, might have been effected. The results that may follow the neglect of the warning conveyed by the presence of the pancreatic reaction in the urine are well illustrated by the following case. In May, 1904, I was asked to examine the urine of a girl who was complaining of indefinite abdominal symptoms, with loss of appetite and general ill-health. I found a positive "pancreatic reaction," a considerable excess of indican, and a rather high proportion of ethereal sulphates, and consequently diagnosed "chronic pancreatitis, probably secondary to a gastro-intestinal catarrh." It was stated, however, that there was no evidence clinically of disease of the pancreas, and, as the surgeon in charge of the case considered that the symptoms were due to appendicitis, he operated for that disease. In June, 1906, I was again asked to see the patient and found that she was much wasted and was passing 5 per cent of sugar in her urine. She still gave a well-marked "pancreatic reaction," and I diagnosed pancreatic diabetes. The patient was put on a restricted diet and treated for that condition, but the disease was now too far advanced to hope for any very great improvement. In this case the diabetes was apparently due to disease of the pancreas secondary to a duodenal catarrh. The pancreatitis certainly existed for two years, and probably for four, before the destruction of glandular tissue had advanced sufficiently far to interfere seriously with carbohydrate metabolism.

The striking increase in the death rate from diabetes shown in recent years by the Registrar-General's returns is probably not unconnected with the greater prevalence of digestive disturbances, and I would urge that when symptoms of dyspepsia are combined with the presence of the "pancreatic reaction" in the urine prompt steps should be taken to deal with the pancreatitis that is present, lest, in the course of time, worse should befall. In addition to the routine medical treatment of such cases I make use of salicylate of soda and intestinal antiseptics, such as sulphocarbolate of soda or izal, with a view to controlling the infection of the pancreatic ducts. Physiological rest is also given to the pancreas by a carefully selected diet and by placing the meals at the longest possible intervals from each other. If, after

a fair trial, these methods are found to fail, and the "pancreatic reaction" persists as markedly as ever, recourse must be had to surgery. The pancreatic ducts must be drained by cholecyst-enterostomy, and, if necessary, a gastro-enterostomy will give rest to the inflamed duodenum.

Diabetes is not a common result of obstruction of the common duct by gallstones, but it does follow in a certain proportion of cases, and it is impossible to foretell what will result in any particular instance. I have already mentioned one case in which glycosuria developed eight and a half years after an operation at which, although the gallstones were removed, no provision was made for dealing with the pancreatitis that was present, and I have met with other similar cases in which sugar was found three or four years after an operation for gallstones in the common duct. In 65 consecutive cases where biliary calculi were found at operation in the common bile duct, and the pancreas was enlarged and hard, sugar was found in the urine of 4 (6 per cent). In 3 of these the amount was under 0.2 per cent, and in the fourth 0.4 per cent was present. All gave a characteristic "pancreatic reaction". After these patients had been operated upon by Mr. Mayo Robson, and the pancreatic and bile ducts drained through a cholecystenterostomy opening, the sugar and "pancreatic reaction" disappeared from the urine of all but the last. In this case the "pancreatic reaction" persisted, the sugar gradually increased, and ten months after the operation he died of diabetic coma. Chronic pancreatitis is found to be associated with about 70 per cent of cases of common duct cholelithiasis, and as medical treatment has little or no effect on the disease, it is important that all gallstone cases should be operated on at the earliest possible moment, particularly it there is a well-marked "pancreatic reaction" in the urine. A small amount of sugar is no bar to operative interference, in fact, as I have stated above, it may result in the disappearance of the glycosuria.

Both pancreatic calculi and cysts are probably the results of catarrhal pancreatitis, due to an infection of the ducts from the duodenum, and although no radical benefit can be expected to follow the treatment of the diabetes occasionally found to complicate these conditions, much may be done to prevent their onset and to avoid a consequent glycosuria by timely recognition of the chronic pancreatitis that precedes and accompanies them.

The treatment of cases belonging to the second and third classes calls for no special remark. The etiology of arterio-sclerosis and interacinar pancreatitis is alike obscure, and until we have further information with regard to them empirical methods of treatment are all that can be adopted. Syphilitic patients with diabetes are said to have been cured by anti-syphilitic treatment, but, as a rule, the result is not satisfactory. The arterio-sclerotic type of diabetes is the most hopeful. It is the form most commonly met with in elderly people and is probably due to circulatory disturbances in the pancreas. It is not infrequently associated with granular kidney and traces of albumen in the urine. These patients usually respond well to dietetic and general hygienic treatment, carefully applied according to the requirements of the individual case. All the 5 cases I have had the opportunity of observing have much improved under treatment. Diabetes due to destruction of the pancreas by malignant disease, either primary or secondary, is beyond all forms of satisfactory treatment.

The pancreatic theory of diabetes, as it stands at present, does not meet every difficulty or open a royal road to the cure of the disease. It makes clear, however, many points in the etiology that were formerly obscure and suggests means by which the old adage, Prevention is better than cure, may be applied to many cases of this most troublesome and fatal disease.

PANCREATIC CATARRH AND INTERSTITIAL PANCREATITIS IN THEIR RELATION TO CATARRHAL JAUNDICE AND ALSO TO GLYCOSURIA

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CATARRHAL jaundice has for ages been described clinically and is one of the best examples of a symptom giving its name to a disease.

I venture to think that the true pathology of the disease has been misunderstood, and in the greater number of cases the cause is in the pancreas and not in the bile ducts, which are simply obstructed and not necessarily inflamed.

At first sight, for a surgeon to take as his subject one which the physicians have generally considered to be purely medical from first to last, may appear unusual, but I would remind my hearers that during the past thirty years we have, as the result of observations made on the living patient during operation, frequently had to alter our views of the pathology of a disease when those views had been founded on post-mortem examination alone.

It has been hitherto generally accepted that both acute and chronic catarrhal jaundice are always due to a catarrh extending to the bile ducts from the duodenum and that the swelling of the bile channels leads to obstruction of the bile flow from the secreting part of the liver.

Dr. Hilton Fagge, however, doubted that catarrh of the bile ducts gives rise to a swelling of the mucous membrane. He says: "A more probable suggestion is that catarrh of the duodenum obstructs the oblique and narrow passage of the duct through the walls of the gut." If so, we may ask why jaundice does not more commonly follow what is probably a frequent disorder?

This may be and is possibly true sometimes, though it is difficult to prove, as the slighter cases of acute catarrhal jaundice neither cause death nor require surgical treatment.

The severer cases of catarrhal jaundice starting in the same way as acute catarrh, but ending in chronic jaundice, have however afforded many opportunities both for clinical observation and pathological investigation, and as the result of this experience I believe that while many of the ordinary cases of acute catarrhal jaundice are pancreatic in origin, nearly all or possibly all cases of so-called chronic catarrhal jaundice are due to catarrh of the pancreas or to interstitial pancreatitis.

My aim is to adduce arguments in support of these views, which were mentioned by me in my Hunterian Lectures on the Pancreas before the Royal College of Surgeons in England in 1904, and later in addresses before the Canadian Medical Association and the Royal Medical Society of Edinburgh.

When it is borne in mind that the bile ducts have only a limited calibre, that the secretion of bile takes place under very low blood tension, and the excretion of bile along the ducts has very little force behind it, and is therefore arrested by a slight obstruction, it is easy to realize how a comparatively slight pressure on the outside of the common duct will lead to arrest of the flow into the duodenum and to the absorption of the secreted bile by the lymphatics or blood vessels, thus leading to jaundice.

This obstruction may doubtless at times occur within the ducts as hitherto believed, owing to a swelling of the mucous lining of the ductus communis or of the papilla, it will then be due to a true cholangitis (I need not now refer to gall-stones or other obstruction); or it may be due to pressure on the outside of the common duct by the swelling of the head of the pancreas, which occurs in cases of catarrh of the pancreatic ducts and in interstitial pancreatitis in about two thirds of all pancreatic inflammations. The jaundice will then be of pancreatic origin. We may, therefore, speak of catarrhal jaundice as being of two varieties, cholangitic or pancreatic.

Seeing that acute catarrhal jaundice does not "per se" lead to death, post-mortem evidence can only be obtained when the disease coincides with some other local ailment

or fatal accident, and in such cases where this opportunity has arisen there has been no sign of internal obstruction of the ducts, as shown by the easy passage of a probe from the papilla and by laying open the bile passages. Neither can post-mortem evidence always be relied on to prove the pressure that may be exercised by the inflamed head of the pancreas; as after death the swelling of the head of the pancreas from engorgement may subside and only by microscopic examination or by examination during life with the abdomen open may it be possible to prove the condition of the pancreas. I had the opportunity of observing the condition in one case of jaundice on which I operated for gall-stones, in which death was due to apoplexy, occurring during anæsthesia and where a post-mortem examination of the pancreas which surrounded the common duct revealed nothing abnormal to the naked eye, but in which a careful microscopic examination shewed a small celled infiltration between the lobules of the pancreas and swelling of the secreting cells of the gland. In this case the swollen head of the pancreas was felt at operation after the presence of pancreatic inflammation had been proved by an examination of the urine and fæces.

If, however, it is difficult to prove the cause of the obstruction in acute catarrhal jaundice from lack of post-mortem evidence, there is not the smallest difficulty in demonstrating the cause in so-called chronic catarrhal jaundice, which is, I believe, practically always dependent on catarrh of the pancreas or on interstitial pancreatitis.

I had the honor, in a lecture given before the London Polyclinic in July, 1900, of drawing attention to the clinical and pathological importance of chronic inflammations of the pancreas, which diseases were up to that time considered merely as pathological rarities of no practical importance.

I then demonstrated the fact that interstitial pancreatitis might simulate in many of its symptoms cancer of the head of the pancreas, owing to pressure on the common bile duct and the consequent presence of jaundice, and that such cases, if not treated, might terminate fatally under the supposition that the disease was malignant, whereas by a recognition of the cause and efficient treatment life might be saved in a very large proportion of cases.

The lecture was based on observations extending over a period since 1890, and I was able to illustrate my subject by a large series of cases treated surgically.

Within a short period of the publication of that lecture numerous surgeons, both at home and abroad, confirmed the accuracy of these observations and reported cases successfully treated.

An extended experience of over 200 cases in which I have operated on patients suffering from chronic interstitial pancreatitis or from chronic pancreatic catarrh as clinical entities, or from those affections complicating other diseases of the duodenum or gall-bladder, has confirmed my original observations, and the subject has been established on a firm basis both with regard to pathology and treatment.

The difficulties of making an accurate diagnosis of chronic inflammatory disease of the pancreas was at first considerable, but in a lecture that I gave before the American Surgical Association in 1901, I was able to announce the fact, that while working in conjunction with Dr. P. J. Cammidge to try and find some evidences of metabolic changes in the urine of these cases, my colleague working on theories that we had previously discussed, had discovered by an elaborate chemical investigation that certain characteristic crystals could be obtained from the urine in cases of inflammatory disease of the pancreas, which were peculiar to the disease in question. The usefulness of this test has as yet not been fully appreciated in this country, though in Germany, in Russia and in some other countries reports as to the value of the method have been received. This chemical test has proved of the greatest help to me clinically, as it enables a diagnosis to be made in a very large proportion of cases even in the early stages of catarrhal inflammation.

For the details of the process I would refer my hearers to a work on the Surgery and Pathology of the Pancreas just published by Messrs. Saunders & Co., where may be found a full description of the technique employed.[1]

[1] EDITOR'S NOTE.—See also The Technique of the Examination of the Urine and Fæces in Suspected Cases of Disease of the Pancreas, by P. J. Cammidge, SURGERY, GYNECOLOGY AND OBSTRETICS, vol. iii, September, 1906, p. 440. Also page 22 of this issue.

Another valuable help in diagnosis may be obtained by a careful chemical analysis of the fæces, especially for fat, of which the greater part in pancreatic disease is unsaponified neutral fat.

Although in any single case we may not have all the typical symptoms and signs, yet in no case ought we to fail to find evidences of digestive, metabolic, or physical signs if chronic inflammation of the pancreas be present.

There can be, therefore, no justification for the view still entertained by some clinicians that chronic pancreatitis or even catarrh of the pancreas can be rarely recognized during life as a clinical entity, for from the information obtained by a careful physical examination of the patient, a knowledge of the history of the case and the results of a chemical and microscopical examination of the excreta a correct opinion may be proved in a large majority of cases.

It is not my intention to consider fully all the questions bearing on chronic interstitial pancreatitis in its advanced stages, but rather to show that the so-called chronic catarrhal jaundice is pancreatic in origin, that it is the first stage in the more serious disease, chronic pancreatitis, and that by timely treatment the morbid process can be arrested.

The so-called chronic catarrhal jaundice is characterized by jaundice more or less deep, coming on painlessly and associated with digestive disturbances and with great loss of flesh. If the disease has persisted for some weeks, the liver is generally swollen and readily palpated, its edges being smooth and not nodular. The gall-bladder may be enlarged if the pressure on the bile duct is great and cholelithiasis has not previously led to its contraction.

If there is intermittent pain, it is usually due to some complication such as chronic catarrhal cholecystitis or cholangitis, or to gall-stones or duodenal ulcer, both of which may cause catarrhal pancreatitis. If there are rigors they are usually dependent on associated infective cholangitis.

Besides the dark urine and the light bulky fæces there is usually intense irritation of the skin, which from repeated observations I think is much greater when jaundice is of pancreatic origin than in cases where it is dependent on obstruction higher up in the biliary passages.

On palpation, tenderness can usually be elicited on pressure about ½ to 1 inch above the umbilicus in the midline and occasionally, if the patient is thin, a transversely elongated swelling may be felt there.

An examination of the urine will usually afford a positive pancreatic reaction, and the fæces will usually show a great increase in the excretion of fat, the proportion of neutral fat to fatty acids being especially increased.

The following case out of many that I could relate affords an example demonstrating that the jaundice attributed to cholangitis was caused by the swollen and inflamed head of the pancreas pressing on the common bile duct.

A lady, aged 50, had for several years suffered from attacks of distinct biliary colic, which during the past two months had been followed by jaundice, fever, and collapse. There had recently been loss of flesh. On examining the urine, fine pancreatic crystals were discovered, and at the operation on April 30, 1903, forty gall-stones were removed from the gall-bladder and cystic duct. None were found in the common duct, though the head of the pancreas was distinctly swollen and harder than normal. The gall-bladder was drained. The patient made a good recovery and is now well. Normal weight has been regained, and there is no longer any evidence of disturbed metabolism.

This is a good example of the so-called catarrhal jaundice so frequently seen associated with gall-stones, though the concretions are in the gall-bladder or cystic duct and can therefore not be directly responsible for obstructing the flow of bile into the intestines.

The pancreatic ducts become infected at the same time as the bile ducts by the catarrhal process extending from the duodenum, and this leads to swelling of the head of the pancreas and so to pressure on the common bile duct and to slight obstructive jaundice.

It may be asked, why are not all cases of gall-stones in the gall-bladder associated with jaundice?

The explanation is an anatomical one,—in 62 per cent of all cases the pancreas embraces the third portion of the common bile duct, whereas in 38 per cent the bile duct passes entirely behind it, hence — although pancreatic catarrh or interstitial pancreatitis may be a

frequent concomitant of cholelithiasis, in only about two thirds of such cases will it be likely to lead to jaundice by pressure on the main bile channel, for if the choledochus passes behind and not through the head of the pancreas, the duct may escape when the pancreas is congested or otherwise swollen, whereas if it pass through the gland, any congestion or swelling of the pancreas will, by pressing on the common duct, bring on jaundice with its various sequelæ. Thus are also explained many of the cases of so-called catarrhal jaundice, which may come on as an extension from gastro-duodenal catarrh, or in the course of a pneumonia, or during typhoid fever, influenza, and other ailments.

I have proved this hypothesis to be correct at operations undertaken for chronic jaundice and diagnosed as chronic catarrhal jaundice in many cases quite independent of cholelithiasis, as in the following cases and in others reported in the Lancet for December 23, 1905, and for March 19, 26, and April 4, 1904.

A woman, aged 35, was seen on September 11, 1899, with the history of having been subject to attacks of spasms in the upper abdominal region for twelve years, the intervals between the seizures having varied from a few days to several months, but of late they had become much more frequent, and during the week before she was seen she had had four attacks, all severe ones. The seizures began with pain in the epigastrium, accompanied by cold sweats and faintness; the pain passed through the midscapular and to the right subscapular region and lasted from two to six hours, having to be relieved at times by morphia. Jaundice followed the seizures, and if the attacks recurred frequently it was intensified with each, but if there was a long interval only an icteric tinge remained. Palpation revealed a point of tenderness in the midline, one and a half inches above the umbilicus, where there was a sense of resistance with an abnormal fulness, but there was no tenderness over the gall-bladder nor could any swelling of the gall-bladder or liver be discovered. On September 21st a vertical incision through the right rectus exposed adherent viscera, and on the separation of the adhesions a thickened gall-bladder was exposed, but there were no gall-stones in it or in the ducts. The lower part of the common duct was surrounded and overlaid by a well-marked swelling of the pancreas, which was harder than usual, but not sufficiently hard to be mistaken for cancer, though it was somewhat nodular. Cholecystotomy was performed, and drainage was carried out for a fortnight. Recovery was uninterrupted and the patient returned home within the month, and she has remained well since.

As shewing that the gall-stones and cholangitis were not the cause of chronic catarrhal jaundice, the following case in which the jaundice persisted after their removal, but which was ultimately cured by cholecystenterostomy, will demonstrate.

Mrs. W., aged 57, had had two operations previouly in Scotland. On the occasion of the first operation in September, 1902, a number of gall-stones were removed from the gall-bladder which was drained for a few days, but after the wound had healed the attacks had been repeated as before. A second operation was undertaken by the same surgeon without finding anything definite in the gall-bladder. After the wound had healed, and the temporary drainage had ceased, the attacks again returned and the subsequent history up to the time of my seeing her was that she had almost daily attacks of pain accompanied by slight jaundice, and on five or six occasions, usually at intervals of a month, she had had violent seizures necessitating the use of morphia. About five weeks before I saw her the pain was so violent as to cause her to faint, and just before coming to London another violent seizure, accompanied by collapse, occurred. A rigor with high temperature, 104 or 105° F., had followed each attack, the temperature between the seizures rising to 101 or 102° F. She was rapidly losing flesh and strength. An examination of the urine showed no albumin or sugar, but a well-marked pancreatic reaction, rendering, along with other signs, the diagnosis of chronic pancreatitis certain. At the operation on November 20, 1903, the adhesions were found to be most extensive. There was well-marked enlargement and hardness of the pancreas along its whole length, but it was not nodular. The common duct was carefully examined, but found to be free from concretions, and on opening the gall-bladder a probe was passed through it and the cystic duct and common ducts into the duodenum. While the probe was in position the pancreas was manipulated and found to compress the duct, thus accounting for the obstruction. Cholecystenterostomy was therefore performed, the union being effected by means of a decalcified bone bobbin. At the time of operation the gall-bladder was separated from its fissure in the liver in order to make it reach the bowel without tension. For a few days after operation, bile was discharged from the torn liver surface in free quantities, but there was no leakage from the newly joined viscera. As the bile obtained a free passage into the bowel it gradually ceased, being discharged from the liver and the tube was able to be left out at the end of ten days. The wound healed by first intention, and the patient was up at the end of three weeks. She was then able to take and digest her food, and has since been quite free from her old attacks.

The following case illustrates the persistence of a catarrhal pancreatitis keeping up the jaundice even after the natural passage of a gall-stone.

A patient, aged 38, after being subject to indigestion for years had biliary colic in July, 1899, and passed gall-stones which were found in the motions. Subsequently the attacks of pain were frequent and severe, necessitating the use of morphia. They were usually accompanied by icterus, which, though slight, probably never quite disappeared. When I saw him in November, 1903, he had lost flesh, and was prevented from carrying on his professional duties. The metabolic and digestive signs of pancreatic catarrh were well marked. At the operation on November 23, 1903, no gall-stones were found, though the gall-bladder was thickened and adherent to contiguous organs. The pancreas was firmer than usual and compressing the common duct. Cholecystotomy led to recovery, though the drainage of the bile ducts had to be continued for three months. The patient is now well.

In this case the pancreatic catarrh had evidently been set up by the passage of gall-stones through the common duct. The pancreatitis had, however, persisted and was not only keeping up painful symptoms, but leading to obstruction of the bile ducts and to interference with nutrition. Now this case would formerly have been called catarrhal jaundice, whereas it was really due to catarrhal pancreatitis, as proved by the digestive and metabolic signs, and later by operation.

I could relate other instances, but this case will suffice to show that pancreatic catarrh may be produced by a passing gall-stone and persist after the cause has disappeared, and that drainage of the bile ducts is followed by cure.

If, after some time, the stone passes, the pancreatic catarrh may subside and leave no trace, or the swelling of the pancreas may persist, become true interstitial pancreatitis, and for a long time keep up pressure on the common bile duct, leading to a persistence of the jaundice, though there is no concretion left to cause obstruction nor any evidence of disease of the liver.

Drainage of the common or hepatic duct may have to be performed for jaundice due to interstitial pancreatitis where there is absence or contraction of the gall-bladder, either owing to the gall-bladder having been removed at a previous operation, or to its having contracted as the result of gall-stone irritation. This is a much less satisfactory operation than cholecystenterostomy, as drainage of the common duct has to be continued for some length of time and the biliary fistula is a source of great distress to the patient. I have had to drain the common duct in several such cases where it was impossible to relieve the patient in any other way; and in one case it necessitated the biliary fistula being continued for a considerable time.

This brings into prominence the undesirability of removing the gall-bladder as a routine procedure in operating for gall-stones, for unless it is seriously damaged or ulcerated, or is the seat of malignant disease, or unless there is ulceration or stricture of the cystic duct, removal is quite unnecessary. I think it better practice to drain it simply and not to perform cholecystectomy, since on some future occasion, should trouble develop in the deeper ducts or in the pancreas, and the gall-bladder be absent, it will be impossible, with few exceptions, to short-circuit the obstruction. Moreover, after cholecystotomy gall-stones have no greater tendency to re-form than they have after cholecystectomy, and should cholelithiasis again develop, it will be in the common duct, a much more serious position than if in the gall-bladder.

The following case affords a good example of the advantage of sparing the gall-bladder in operating for gall-stones.

Mr. T., aged 45, was seen on July 27, 1905, suffering from jaundice and a biliary fistula. He gave the history that he had been operated on in October, 1904, by a hospital surgeon for suppurating gall-bladder, but that the wound had never healed and a biliary sinus had persisted. He consulted a well-known continental surgeon, who advised operation. When seen he had a temperature of 100°F. and looked ill. He said that he was subject to shivering attacks. His tongue was coated, and there was slight jaundice. A biliary fistula was present, which was discharging a small quantity of bile and pus. He had lost weight considerably. The urine showed a well-marked pancreatic reaction, and the fæces contained a quantity of fat and muscle fibre.

I operated on July 28, 1905, when the abdomen was opened and the gall-bladder was separated from the fistula, which was excised. The head of the pancreas was hard, and evidently the seat of interstitial pancreatitis which compressed the common bile duct. No gall-stone could be felt in the common or hepatic ducts.

The gall-bladder was therefore connected to the duodenum so as to short-circuit the obstruction. The patient made a good recovery and forthwith began to regain his lost flesh, the jaundice disappeared, and his skin soon assumed a healthy colour.

He called to report himself in January, 1907, and said that he was in perfect health. An opportunity was taken of examining his urine some time after the operation, when it was found to be normal and to show no traces of the pancreatic reaction.

If the common duct is greatly dilated, it may be possible to make an anastomosis between it and the duodenum so as to short-circuit the obstruction in the head of the pancreas.

The following case affords an example of choledochenterostomy in such a condition.

Miss F., aged 28, was seen in June, 1903. She gave the history that four years previously she had had typhoid fever, since which time she had never been well. A year previously she had an attack of pain, followed by jaundice with some enlargement of the gall-bladder. An operation was performed in January, 1902, by another surgeon. No gall-stones were found, but the head of the pancreas was much enlarged. Cholecystotomy was done, and the wound healed within the month. She made a good recovery from the operation and was apparently well until March, 1903, when she had a recurrence of the jaundice with sickness and pain. She became very ill and rapidly lost flesh. When I saw her there was some enlargement of the gall-bladder, with a distinct cystic swelling over the pancreas, and the urine gave the characteristic pancreatic reaction. On June 4, 1903, an operation was performed, when a large cyst was found on the inner side of the gall-bladder, containing bile and pus, which was evidently a dilated common bile duct. No gall-stones were found, but there was some swelling of the head of the pancreas. The gall-bladder was also distended and inflamed, and it was drained by a separate tube. The patient made a good recovery from the operation and returned home wearing both tubes. She was seen again in October, 1903. Since the former operation there had continued to drain away through the tube in the dilated common duct from 20 to 30 ounces of bile, and from the tube leading into the gall-bladder from 4 to 6 ounces of clear mucus. The patient was thin and feeble, had no appetite for food, and was unable to digest anything beyond a little milk. An examination of the urine revealed the characteristic pancreatic reaction, and the fæces contained muscle fibre and much neutral fat. On the 8th of October a further operation was undertaken, when the head of the pancreas was again found to be much enlarged, but no concretions could be felt in it or in the common bile duct. The gall-bladder was completely excised and the cystic duct ligatured. The dilated common bile duct was then connected to the duodenum by means of a decalcified bone bobbin, and the wound was closed. The same evening the patient expressed herself as feeling hungry for the first time since her illness began. She straightway began to absorb whatever nourishment was taken, had her bowels moved on the second day, gained strength, resumed her natural colour, and made such a rapid convalescence that she returned home within the month, having gained 7 pounds in weight. In 1906 a report was received to say that the patient was in perfect health.

For the anatomical reason previously referred to, in only two thirds of all cases of common duct cholelithiasis is the pancreas likely to be involved, or if involved to participate in causing jaundice.

Curiously Dr. Cammidge's analysis of the urine in a very considerable number of cases of common duct cholelithiasis with more or less jaundice, in which I have subsequently performed cholecystotomy, has shown that in two thirds of the cases pancreatic catarrh or interstitial pancreatitis has been present, as shown by the characteristic reaction, whereas in about one third of the cases the presence of common duct stones was not associated with pancreatic disease.

This proportion corresponds with Helly's figures, based on anatomical research. He showed that in 62 per cent of bodies the pancreas embraced the common bile duct and in 38 per cent the bile duct passed behind the pancreas.

For some years, whenever I have been operating on the common bile duct for the removal of concretions, it has been my custom to pass a probe down the duct into the duodenum and with the fingers of the left hand to palpate the whole length of the duct, which is easily done when the probe is in position.

The result of these observations has been to establish the fact that when the bile duct passes behind the pancreas, the latter is seldom affected with inflammatory swelling, but when it passes through the gland and gall-stones have been present in the duct, the pancreas is practically always affected.

This was well shown in a case I operated on at Southport last week in which there was no pancreatitis, though there were gall-stones in the common duct, and in which after their removal I passed a probe down into the duodenum and could palpate the whole of the common duct from below, as no pancreas intervened, and the head of the pancreas felt in front of the duct was quite normal.

The same condition was also shown in another case that I operated on in London the next day.

If the gall-stone causing obstruction be

removed by operation from the common duct and drainage of the infected bile ducts be effected before the catarrhal has passed into the interstitial form of pancreatitis, a complete cure may be expected, as in the following case.

The patient, a lady, aged 34, had had symptoms of gall-stones for four years, and had been under treatment for ulcer of the stomach, but there had been no hæmatemesis. Four months previous to my seeing her, jaundice had come on after an attack of pain, since which time the attacks had been frequent and were always followed by an increase of the jaundice and by rigors and fever. On one occasion the gall-bladder was distended; when seen there was a slight tinge of jaundice. She had lost three stones in weight. There was an absence of enlargement of the liver or gall-bladder, but marked tenderness over the gall-bladder was elicited. The pancreatic reaction was obtained from the urine, and digestive symptoms were present.

At the operation on April 23, 1903, one large calculus was removed from the cystic duct and some smaller ones from the common duct by choledochotomy through separate incisions in the two ducts. The common duct was sutured and the cystic duct drained. The pancreas was found to be enlarged and inflamed. The patient made a good recovery and is now well, without any trace of pancreatitis being found by examination of the urine and fæces.

In another case, the patient, a lady, aged 59, began to suffer from abdominal pain, followed by jaundice and vomiting, 26 years ago, and she had been subject to attacks at longer or shorter intervals ever since. Fifteen years ago she was in bed for three months with constant pain, but never had rigors. A fortnight since she had a severe attack of pain followed by jaundice, which persisted. She had lost four stones in weight. There was no enlargement of the liver or gall-bladder, but some dilatation of the stomach. Pancreatic crystals were found in the urine. At the operation on March 10, 1903, a small gall-bladder was found containing two gall-stones, which were removed, and the gall-bladder drained. The common and hepatic ducts contained many stones, which were removed through an incision in the common duct, the gall-bladder being drained. The pancreas was swollen and compressing the common duct. The patient made a good recovery and remains well, as shown both by physical signs and the absence of a pancreatic urinary reaction.

The explanation of the pancreatitis in these two cases was manifestly the obstruction of the pancreatic duct, with infection of the secretion, but the complete recovery after operation showed that the inflammation was only catarrhal and not advanced interstitial trouble.

If the gall-stone obstructs the common duct for long, what was at first a simple catarrhal pancreatitis may assume a truly interstitial form, and unless drainage of the bile ducts is continued for some time, or permanent drainage in the shape of cholecystenterostomy is established, relapse will speedily occur, as shewn in several cases I have seen.

If the interstitial pancreatitis has persisted for some length of time, the recovery may be incomplete, and although the jaundice may disappear and the digestive symptoms may be alleviated, the metabolic signs found in the urine many months or even years, subsequently, show that the recovery is only partial.

The following are examples.

Mr. D., aged 45, had had painful epigastric attacks for twelve months, with vomiting, but no jaundice. There had been deep jaundice since January 1st, with ague-like attacks, and the patient had lost 2½ stones in weight. Cholecystotomy was performed on March 29, 1898. A swelling of the pancreas, thought at the time to be cancer of the head of the pancreas, compressing the bile duct was felt. Drainage of the gall-bladder was adopted, but the tube was only left in for ten days.

The patient made a complete recovery and in August was apparently quite well, having gained a stone in weight. He was in good health in 1901. Though apparently well in January, 1904, an examination of the urine gave the pancreatic reaction and showed that the original damage to the pancreas had not been completely repaired.

Mrs. D., aged 46, had had spasms for years. Acute seizures in July and three times since. Since July pain and sickness every two weeks. No tumour felt at any time; jaundiced occasionally after an attack of pain; lost one stone in weight. She had never vomited blood and never had melæna. There was tenderness over the gall-bladder, but no tumour. Enlargement of the head of the pancreas felt on palpation. Cholecystotomy performed on December 11, 1899. Empyema of the gall-bladder. Many stones removed from the gall-bladder and cystic duct. Adhesions broken down. Nodular condition of the head of the pancreas found. The patient made a good recovery and was well in 1904, though an examination of the urine showed the pancreatic reaction and proved that the metabolic functions of the pancreas were still not normal.

This brings me to the second part of my subject, the relation of interstitial pancreatitis to glycosuria.

Glycosuria is by no means a common symptom of pancreatic disease, and cannot be relied upon as a diagnostic symptom. When present it indicates a serious, although not necessarily a hopeless condition. The relation of diabetes to disease of the pancreas has been

clearly established in a considerable proportion of cases, but both experimental and clinical observations have shown that pancreatic glycosuria occurs only when the greater part of the pancreas has been removed or destroyed. The appearance of sugar in the urine along with other signs of disease of the pancreas, therefore, points to a wide-spread and advanced lesion. This is particularly the case in chronic interstitial pancreatitis of the interlobular type, which is the form that follows obstruction of the ducts by calculi and is produced by ascending catarrhal inflammations from the duodenum. *Interacinar pancreatitis* on the other hand gives rise to glycosuria at an earlier stage, but is a much less common disease than the interlobular variety. Malignant disease of the pancreas rarely causes diabetes, and then only, as a rule, when the whole organ has been destroyed by the growth.

The suggestion that the islands of Langerhans are concerned in the production of the "internal secretion" of the pancreas was first made by Laguesse. This view was subsequently adopted by Schäfer, Diamare, and others. The theory that such a relationship exists is based partly on histological grounds and partly upon the results of experimental work, but the most important evidence in support of it has been furnished by pathological observations, which suggest that pancreatic diabetes is due to a disturbance of the functions of the cell islets. The peculiarity of their structure, their independence of the duct system of the gland, and their comparative resistance to certain morbid changes by which the secreting acini are destroyed, point to their being independent organs with an independent function; while their rich blood supply may be taken to indicate that they are possibly vascular glands engaged in the elaboration of some internal secretion which is poured into the blood stream.

Opie considers that diabetes is peculiarly related to interacinar pancreatitis and that in the interlobular form it is rare. The difference, he considers, depends upon the relation of the fibrous tissue overgrowth to the islands of Langerhans, which he in common with many other observers believes are responsible for the elaboration of the internal secretion by means of which the pancreas exerts its influence upon carbohydrate metabolism. The newly formed fibrous tissue in interacinar pancreatitis is diffusely distributed within the lobules and between the individual acini, so that the islands are affected at the same time as the other elements of the gland, but in the interlobular form, which is the type following duct obstruction, the proliferation of fibrous tissue takes place between the lobules and invades them from the periphery, so that the cell islets suffer only when the process is far advanced, and the secreting parenchyma has been replaced by masses of scar-like tissue. Opie found that diabetes was present in 7 out of 9 cases of interacinous pancreatitis, but that in only one out of 21 cases of chronic interlobular inflammation of the gland was there sugar in the urine. In this one case of interlobular inflammation the induration of the gland was far advanced and the islands of Langerhans were fibroid. The two cases of interacinous pancreatitis in which diabetes was absent were both, he found, in an early stage of the disease.

The pathological changes that have been met with in the interacinar islets in cases of diabetes are hyaline degeneration, necrosis, atrophy with vacuolisation and liquefaction of the cell-protoplasm, acute and chronic inflammation with hæmorrhage sclerosis, or calcification, and diminution of the number of islets.

Opie's description of hyaline degeneration in the islands of Langerhans alone, in diabetes, furnished the most convincing evidence of the association of these structures with carbohydrate metabolism up to that time available, and from the publication of his paper in 1901 may be dated a revival of interest in the pancreatic theory of diabetes, and a more searching and minute enquiry on the part of other observers into the condition of the cell islets in fatal cases coming to post-mortem. In 19 cases of diabetes in which Opie investigated the condition of the islands of Langerhans, he found hyaline degeneration in 7 (35 per cent).

Chronic interstitial pancreatitis has been frequently observed in association with diabetes, but in the majority of cases where inter-

stitial changes in the pancreas arise from obstruction of the ducts by gall-stones, or from other causes, glycosuria is not met with as a symptom. In 65 consecutive cases where biliary calculi were found in the common duct at operation and in which the pancreas was enlarged and hard, sugar was detected in the urine of 4 (16 per cent). In 3 of these the amount was under 0.2 per cent, and in the fourth 0.4 per cent. After operation the sugar disappeared from the urine in all but the last, in which it slowly increased in amount, the patient dying from diabetic coma ten months subsequently. Since the interstitial changes arising from the presence of gall-stones in the common duct principally affect the head of the gland in the first instance, and the results of experiments upon animals have shown that even a small portion of healthy pancreatic tissue will prevent the onset of diabetes, or at least delay the appearance of the symptoms, so long as it remains undestroyed by fibrotic changes, the comparative rarity of glycosuria in these cases is not difficult to explain. When, however, a great part of the parenchyma has been destroyed, or is functionally impaired by the progressive changes consequent on repeated or long-continued irritation, either from gall-stones or an unrelieved duodenal catarrh, sugar will make its appearance in the urine, first as an alimentary glycosuria, and later as a permanent diabetes.

In some cases where operation has been delayed or drainage of the bile ducts not performed, or not long enough continued, the original interstitial pancreatitis may pass on into the interacinar variety, in which the islands of Langerhans become involved and glycosuria ensues, as in the two following cases.

Mrs. C., aged 51, who was suffering from persistent jaundice, with periodical pains and ague-like seizures that had extended over a long period, was operated on in July, 1895, when several gall-stones were removed and others crushed and removed from the common duct. A tumour of the pancreas was felt, which it was feared at the time might be malignant. The gall-bladder was therefore drained into the duodenum by a cholecystenterostomy. The patient completely recovered, and has remained well since the operation over nine years ago, but an examination of the urine recently by Dr. Cammidge showed an abundance of dextrose, but no acetone or di-acetic acid. The pancreatic reaction was obtained. This showed that although the patient has been relieved by the operation, and had apparently enjoyed good health, yet that she is living with a damaged pancreas.

Mr. D., aged 42, had an attack of pain in the right hypochondrium ten years ago, but no jaundice. He had been free up to six weeks ago, when he had a severe attack of pain in the right hypochondrium radiating to the back and shoulders, accompanied by rigors and vomiting and followed by jaundice. The jaundice had persisted up to the present. No swelling could be felt. An exploratory operation was performed on October 27, 1898, when a mass, thought to be growth in the head of the pancreas, was discovered. The patient made a good recovery, with a great relief to the jaundice. The enlargement of the head of the pancreas was evidently chronic pancreatitis, as it was too soft for scirrhus. It was freely manipulated in order to ascertain if there was a gall-stone in the termination of the common bile duct, and this may have dislodged an obstruction leading to the relief of the jaundice.

A specimen of his urine was obtained in 1904, and although he was reported to be quite well, this was found to give crystals by the "A" reaction, which dissolved in half a minute, and to contain sugar in fair quantity.

This, along with other cases that I know of, leads me to think that it is unwise not to thoroughly drain the bile ducts, and I consider that drainage ought to be continued until the bile becomes free from organisms and its normal route is free from obstruction.

In certain cases, doubtless recovery occurs without operation, and I have notes of one case where a gentleman of advanced age had deep jaundice associated with glycosuria, and with well-marked pancreatic reaction in the urine, pointing to the case being one of pancreatic diabetes. Under general treatment, combined with massage, he regained his health and is now said to be quite well. In this case it is quite possible that the massage dislodged a concretion which was blocking the common bile duct and the pancreatic duct, but as no search was made in the fæces, this cannot be proved. As the patient lives abroad, I have not been able to test the urine, which, I suspect, will still contain glucose.

We may now consider the question whether operation ought to be declined because of the presence of a small amount of sugar in the urine. My feeling is, that should the patient's condition be fair, operation should be performed in order to remove the obstruction, or by drainage to arrest the pathological process going on in the pancreas.

The difficulty that attends all methods of treating diabetes is vastly increased by the obscurity of the etiology; but where it follows, or is associated with, evidences of pancreatic gall-stone trouble, the origin of the disease is plain, and in the early stages appropriate means of treatment can be adopted with a fair hope of success. I have already referred to 4 cases of cholelithiasis in my own experience that were accompanied by glycosuria and in 3 of which operation was followed by disappearance of sugar from the urine. Gifford Nash's case of acute pancreatitis with glycosuria may also be cited as an example of the satisfactory results attending timely operative interference. It is essential, however, that the disease should not be too far advanced, and for this reason I strongly recommend that all cases of pancreatitis and gall-stones likely to give rise to a pancreatic lesion should be operated on with as little delay as possible after they have been diagnosed. I have shewn that the early recognition of these conditions is not now a matter of great difficulty, if all the signs and symptoms to be obtained by a careful consideration of the clinical and pathological features of the case are taken into account; so that difficulty of diagnosis cannot be urged as a valid excuse for cases of pancreatitis being permitted to proceed untreated to a stage at which diabetes supervenes.

The advantage of cholecystenterostomy in interstitial pancreatitis is that it provides for permanent drainage of the bile passages, so that should the inflammatory tissue in the pancreas further contract and cause increased pressure on the bile duct, no jaundice will occur, and should the inflammatory process pass away, the patient will not be distressed by the presence of a biliary fistula or inconvenienced by the absence during that time of the bile from the intestines; moreover, there will not be the anxiety of any further operation to face, as there would be after a cholecystotomy. But besides the relief of jaundice, the operation acts on the pancreas by relieving tension and thus enabling the gland to discharge its contents, which, when infected and imprisoned in the ducts, tend to keep up inflammation and to lead after a time to atrophy of the gland substance proper and the formation of fibrous tissue.

It will be gathered from the foregoing arguments that I believe cholecystenterostomy to be the operation of choice for the treatment of interstitial pancreatitis, and only in case of absence of contraction of the gall-bladder, or in case of unusual difficulties from adhesion or from the serious condition of the patient, would I counsel cholecystotomy being done.

Results. In considering the after results of the surgical treatment of the class of cases under consideration it is necessary to give both the immediate risks of operation and the ultimate issue of those cases that recovered. To this end, letters were addressed to the friends or medical attendants of all patients who had not recently been heard of (this does not include cases since 1904).

Of 102 operations undertaken in patients where chronic pancreatic trouble constituted the chief disease, or where it formed a serious complication of other diseases, 96.1 per cent of cases were followed by recovery, giving a mortality of 3.9 per cent, but since compiling the foregoing figures, in 1904, experience has very largely increased and the mortality has diminished to a little over 2 per cent.

In the 55 cases of catarrhal interstitial pancreatitis where gall-stones were found obstructing the pancreatic portion of the common duct, choledochotomy was performed in 42, cholecystotomy in 9, and cholecystenterostomy in 4.

Of the 52 patients that recovered, 48 were living and well when last heard of; one is apparently well nine and a half years subsequent to operation, though sugar has recently been found in his urine; one died from cirrhosis of liver and ascites a year after, it being present and far advanced at the time of operation. Another has since died of acute bronchitis, and another from some other non-specified ailment.

In one case where the cause was pancreatic lithiasis and where calculi were removed both from Wirsung's and Santorini's ducts, the patient is now in very good health.

In 46 cases of interstitial pancreatitis without gall-stones or other removable cause, the bile ducts, and thus indirectly the pancreatic ducts, were drained in 19 cases by simple

cholecystotomy, in 17 by cholecystenterostomy, and in 5 by separation of adhesions and thoroughly freeing the ducts. Of the 45 patients that recovered, no reply to letters were received from 6, who were well some time after operation. The rest were in good health when last heard of, with the exception of one (not drained) who has developed glycosuria some years after operation, but is otherwise well; one who shows signs of permanent damage to the pancreas by the urinary test; and one who has anæmia suggestive of the pernicious type.

Besides the 19 cholecystotomies, were 5 where the pancreatitis was associated with duodenal ulcer, and in these cases a posterior gastro-enterostomy was performed at the same time, with good results in every case.

It will thus be seen that in a very large percentage of cases the removal of the cause, together with drainage of the bile ducts, or, in the absence of a removable cause, the simple drainage of the bile ducts alone is an operation that may be safely recommended in suitable cases that have failed to yield to general treatment.

PEPTIC ULCER OF THE JEJUNUM [1]

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PEPTIC ulcer was originally supposed to be confined to the stomach, but increased experience and more careful observation have resulted in the discovery that such ulcers occur very frequently in the duodenum. Peptic ulcer of the esophagus has been reported, and as a result of the operation of gastro-jejunostomy peptic ulcers are now occasionally found in the jejunum.

Peptic ulcer of the jejunum is an unusual condition. The first case was reported by Braun (1) in 1899, 18 years after the first gastro-enterostomy was performed by Wölfler in 1881. In 1903 Watts (2) collected 14, and in the same year Brodnitz (3) gathered 15 cases of this character. Mayo Robson (4), in 1904, analyzed 16, and Tiegel (5) in the following year was able to find 22 cases. In the literature up to January, 1906, Gosset (6) mentions 31 cases in a most complete review of the subject. Since then we have had 1 case in our experience and have noted 7 additional cases in available literature, making a total of 39 cases.

The great majority of reported cases have been those in which acute perforations have occurred. The supposition that many such cases are not reported or that the nature of the perforation is unrecognized is quite reasonable, as is likewise the probability that cases in which acute perforation has not taken place are attributed to other causes. These probabilities, with the rapid increase in the number of reported cases, tend to the belief that this condition is more common than the number of reported cases would seem to indicate. That it is a rare complication is without doubt, as is also the fact that it is a real danger. An estimate as to the percentage of gastro-enterostomies in which it may be expected to occur, is at present impossible because of the small number of cases. Kausch (7), from Mikulicz's clinic, reported 2 cases in 160 gastro-enterostomies. Watts (2) considers this too small a proportion. Paterson (8) found perforating jejunal ulcer in 3 of 295 such operations. He places the risk at less than 2 per cent. Robson's (4) case occurred in 30 anterior gastro-enterostomies, but such a complication did not occur in 16 posterior operations of this character, nor in 100 similar ones by a colleague. Moynihan (9) mentions one possible case in 218 gastro-intestinal anastomoses.

J. C. Munro (10) says, we have no definite data as to the occurrence of peptic ulcer. Such a lesion may explain the late unheralded hemorrhage in 2 of our cases of duodenal ulcer (in

[1] Read at Meeting of Western Surgical and Gynecological Association, December, 1907.

150 gastro-enterostomies). Rarely coming in the posterior operation, as statistics show, we believe the fear of this accident is a small contraindication in cases otherwise suitable for operation.

Jejunal ulcer is conspicuously absent in the remote results of gastro-enterostomy in the hands of American surgeons. In January, 1907, Hamann (11) reported the first perforative case in America. Two cases have occurred in experimental work, in a dog (Watts) (2) and in a cat (Gould) (12).

Peptic ulcer of the jejunum follows the operation of gastro-jejunostomy for benign conditions. The occurrence of such a jejunal ulcer without a previous gastro-enterostomy is unknown, and no case has been reported in which it followed a similar operation for malignant disease, nor has it been known to follow operations of pyloroplasty or gastro-duodenostomy.

PATHOLOGY

In both macroscopic and microscopic appearance the ulcer is similar to peptic ulcer occurring in the stomach or duodenum. It is usually single, in 3 of 24 cases it was multiple; in one instance 4 ulcers being present. It may be associated with similar ulcers of the stomach or duodenum. The usual location is at the stoma or in the jejunum, within from one to seven c.m., generally in the distal limb of the loop. In one case the ulcer was found near the stoma of an entero-enterostomy which had been perforated in addition to the gastro-intestinal communication.

ETIOLOGY

Mikulicz had one case occur after operation for congenital stenosis of the pylorus in a child three months of age. The other extreme in age was 59 years, the average being above 30 years. Male patients were much more frequently involved than the opposite sex. In 37 cases there were 35 males and 2 females. Ulcers of this variety occur after gastro-enterostomy, with or without stenosis of the pylorus.

It has been generally believed that the causative factor is the hyperacidity of the gastric juice, or the normal gastric juice coming directly into contact with the mucosa of the jejunum, without previous neutralization by mixture with the bile, pancreatic juice, and the succus entericus in the duodenum and upper jejunum. Most of these ulcers occur in the distal limb of the jejunal loop. In cases in which gastric analysis was carried out, the majority were found to have an excess of acid, though it was not constant. A noteworthy fact in this connection is that ulcer of the duodenum does not occur after pyloroplasty or gastro-duodenostomy, nor does peptic ulcer of the jejunum occur after gastro-jejunostomy in cases of carcinoma, in which there is generally a hypoacidity.

Paterson (13) says, the predisposing or the exciting cause of peptic jejunal ulcer is probably persistance, or subsequent development of hyperacidity after operation, and consequent digestion of the jejunal mucous membrane by the hyperacid juice. What then are the causes of hyperacidity after gastro-jejunostomy? I suggest that in most instances hyperchlorhydria is due to insufficient size or inefficient working of the anastomotic opening. I quite admit that a slight degree of gastric stasis, due to a small anastomotic opening, may have no ill result, but is it not reasonable to argue that in such a case a slight attack of gastritis, due to some error in diet, insufficient to cause trouble, if the anastomotic opening were larger, may lead to such a degree of gastric stasis that hyperchlorhydria ensues, and this produces, or at least disposes to peptic jejunal ulcer. Doubtless in some cases oral sepsis, or long continued indiscretions, or excesses in diet may lead to septic gastritis and stasis however large the anastomosis opening may be.

In one case direct traumatism to the abdominal wall was supposed to be the cause. Direct injury by food particles, or indirect injury to the mucous membrane at the time of operation may account for some of these cases. With arterio-sclerosis of the vessels of the mesentery, a very slight kinking of that structure may interfere with the blood supply and so predispose to the formation of ulcer.

The frequent occurrence with the anterior operation has been explained by an interference with the circulation of the loop as it was brought over the colon and the omentum. In Mikulicz' consideration of the subject, he

stated that it always followed anterior gastro-enterostomy, but in 34 cases in which the location of the anastomosis is mentioned, it is found that the anterior method was employed 25 times, in 6 of which an additional entero-anastomosis was made, and in 1 a previous pyloroplasty had been done and 9 in which posterior gastro-enterostomy was the route chosen, only 2 with entero-enterostomy.

In the 2 cases occurring in animals the operation was anterior, and in this connection it must be remembered that Cannon and Blake (14) have shown that the anterior operation in animals is the nearest possible approach to the conditions of the posterior operation in man.

The great majority of the above cases are from the German clinics, where the anterior operation has most frequently been employed. As to whether the loop of the jejunum was twisted or not, we do not find sufficient data to warrant an opinion as to this being a possible etiological factor. But in the posterior operations there has probably been a twisted and longer loop than is customary with the more recent and perfected technique, which brings the opening in the jejunum farther from the duodenum. In the posterior operation the jejunal opening is about 9 inches from the origin of the jejunum; in the anterior operation the opening is from 16 to 20 inches from that point.

It would seem with the no loop and no twist posterior gastro-jejunostomy, that the danger of peptic jejunal ulcer is reduced to a minimum.

Of 17 cases in which the method of anastomosis was mentioned, the suture was used 10 times, the Murphy button 6 times, and the Robson bobbin 1 time.

SYMPTOMATOLOGY

The symptoms are those of gastric or duodenal ulcer. Jejunal ulcer should be considered as a possibility in every case in which there is a return of the symptoms for which the gastro-enterostomy had been performed. The symptoms may be latent and may be ushered in by an acute hemorrhage or perforation, with intense pain followed by the usual signs of peritonitis. Acute perforation and general peritonitis took place in 14 of 39 cases.

The more usual history is that of chronic perforation, as is shown by a return of the original stomach symptoms with pain, nausea, vomiting, hyperacidity melana with local tenderness and rigidity. Such a condition was found in 25 of the cases, in 3 of which there was an internal fistula communicating with the large bowel.

The length of time between the operation and the onset of the symptoms may vary within marked limits. The presence of a symptomless period, of longer or shorter duration, after the gastro-enterostomy is necessary, for the purpose of excluding an uninterrupted continuation of the symptoms for which the operation was performed.

In 36 cases in which this interval was mentioned there were:

8	cases in which it was 6 months or under.	
4	" " " " " between ½ and 1 year.	
10	" " " " " 1 " 2 years.	
4	" " " " " 2 " 3 "	
6	" " " " " 3 " 4 "	
1	" " " " " 5 years	
1	" " " " " 7 "	
1	" " " " " 8 "	
1	" " " " " 9 "	

The shortest interval was 10 days and the longest 9 years.

A differential diagnosis can rarely be made between such conditions as peptic ulcer of the jejunum and a return of gastric or duodenal ulcer, complete or partial closure of the stoma, adhesions, kinks, or other forms of incomplete obstruction, or the so-called viscous circle.

TREATMENT

The treatment will primarily be prophylactic, which will consist of internal medication in post-operative-cases, such as sodium bicarbonate to reduce or counteract an excess of hyperacidity, which should be continued for at least a number of months by which time it may rationally be supposed that the jejunal mucosa has become accustomed and resistant to the abnormal and irritating chyme that enters through the stoma. After the onset, the treatment will be either medical or surgical, according to the variety of the symptoms. With the chronic cases, some will be improved

or cured by the regular routine medical treatment for gastric ulcer (2 such cases in 40), others will persist in spite of such treatment and will therefore demand operative interference.

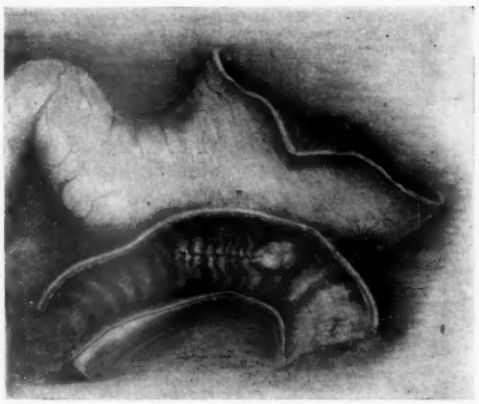
With acute perforation there is of course nothing to be considered but prompt surgical intervention, with repair of perforation and treatment of peritonitis. Various possible operative procedures may be carried out, such as inversion and suture of the ulcer, excision of the ulcer, resection of the jejunum with or without entero-enterostomy or jejunostomy, gastro-enteroplastic operations, secondary gastro-enterostomy, separation of adhesions, or drainage of abscess. If pylorus is patent, with no demonstrable ulcer of stomach or duodenum, the stoma may be closed. The peritonitis will be treated according to generally accepted lines, i.e., removal of the cause by closure of the perforation; no irrigation, with drainage, Fowler's position, and proctoclysis.

Since the publication of the monograph by Gosset (6), which reviews the subject up to January 1, 1906, we report one personal case and collect seven from available literature.

CASE 1. In our own case anterior gastro-jejunostomy was performed by C. W. Oviatt in 1903, for gastric ulcer, with pyloric stenosis and dilatation of stomach. This was followed by relief for two years, after which there was a gradual return and increase of stomach symptoms. Three years after the operation these symptoms demanded a second operation, at which there was found a cicatricial stenosis of the pylorus with dilatation of the stomach, and practical obliteration of the gastro-intestinal stoma. A piece of linen about half an inch long was buried in the mucous surface at the linear cicatrix which marked the site of the gastro-intestinal anastomosis. At one end of this cicatricial depression, the end toward the cardia, there was a marked induration or thickening of the jejunal wall. This mass was about one-half inch in length, one-quarter inch wide and elevated one-eighth of an inch above the surrounding mucosa. It was fibrous in consistency, with its surface white and smooth. It extended through the jejunal wall to the greater curvature of the stomach, to which it was adherent.

A second anterior gastro-enterostomy was made with prompt and (thus far, 9 months) permanent recovery.

CASE 2. Dudgeon and Sargent (15) report a case of perforation of a peptic ulcer of the jejunum occurring in a male 30 years of age, 22 months after gastro-enterostomy for simple gastric ulcer. Acute symptoms had been present for four hours before operation. The perforation was close to the stoma around which the peritoneum was reddened and covered with flakes of lymph. Invagination of the ulcer with flushing and drainage was followed by recovery.



Anterior gastro-jejunostomy showing healed perforated jejunal ulcer at one extremity of the obliterated stoma.

CASE 3. Hamann (11) did anterior gastro-jejunostomy with entero-enterostomy in a male 48 years of age, for gastric ulcer; Murphy button used at each anastomosis. Smaller button passed on the eleventh day, with smooth convalescence until the twenty-first day when he complained of epigastric pain, with the development of a tender indistinct mass in the epigastric and left hypochondriac regions. Death occurred suddenly 26 days after operation. Autopsy showed perfect gastro-intestinal union with a perforated ulcer about one inch in diameter, with a sharply marked border on the anterior wall of the jejunum just beyond its junction with the stomach. The button was in situ, but this was not considered to be the cause of the ulcer. The ulcer was located exactly where the gastric contents would come in contact with the jejunal mucosa. There was a general peritonitis.

CASE 4. Lyle (16). Male, 26 years; was operated upon for acute perforation of a gastric ulcer near the pylorus; there was no stenosis or dilatation. There was marked increase in gastric acidity. The perforation was closed, followed by posterior gastro-enterostomy with entero-enterostomy. Six months after operation symptoms returned which were relieved by medical treatment.

CASE 5. Rushton Parker (17) reports a male, 51 years, who died suddenly because of perforation of a jejunal ulcer three years after anterior gastro-enterostomy for a non-malignant pyloric stenosis. (A pyloroplasty had been previously performed.)

CASE 6. Basil Hall (17) reports a sudden death while drunk, from a perforated ulcer of the jejunum, located 6 inches below the stoma two years after anterior gastro-enterostomy for dilated stomach.

CASE 7. Graser (18) has seen peptic ulcer of the jejunum with perforation and fatal hemorrhage four years after posterior gastro-enterostomy with Murphy

button. The stoma was reduced to the size of a lead pencil.

CASE 8. Edington (19). Male, 46 years. Seven years ago had anterior gastro-jejunostomy performed for benign pyloric stenosis. Two years ago had cholecystostomy for gallstones. Present operation 27 hours after perforation of jejunal ulcer. Ulcer closed and omentum attached to line of suture. Death in 3½ hours.

Of these 39 cases, 29 are from the German, 5 from the British, 3 from the American, and 2 from the French literature.

In addition to the above undoubted cases since the publication of Gosset's statistics, the following probable cases have been mentioned:

Hadra (20). This case has been included in the statistics of some writers and omitted from others. Six months after gastro-enterostomy for pyloric stenosis with hyperacidity, perforation took place; this resulted in the formation of an abscess which was drained and was followed by a fistula. Hadra was unable to determine whether the perforation was in the stomach or the jejunum.

Moynihan (9) speaks of one case in which adhesions around the jejunum of the proximal side of an anastomosis were taken to indicate the possible existence of a peptic ulcer.

Munro (10) states that peptic ulcers of the jejunum may have been the cause of the unsatisfactory results in two cases.

CONCLUSIONS

1. Peptic ulcer of the jejunum is a possible result of gastro-jejunostomy for benign lesions of the stomach.

2. It is probably of more frequent occurrence than the 39 reported cases indicate.

3. It follows the long loop operation more often than the no loop operation.

4. The symptoms may be latent until either acute hemorrhage or perforation occurs.

5. The symptoms may be chronic and simulate those of gastric or duodenal ulcer.

6. Peptic ulcer of the jejunum should be considered in all cases of return of symptoms after gastro-jejunostomy.

7. A symptomless period after the operation, is necessary to eliminate a continuation of the condition for which the gastro-jejunostomy was performed.

8. A differential diagnosis can rarely be made before operation.

9. Prophylactic treatment, aiming to reduce the excess of acidity, should be instituted after all gastro-jejunostomies for benign conditions, and should be continued for at least six months.

10. Treatment will be either medical or surgical, similar to that for gastric or duodenal ulcer.

11. The possible occurrence of ulcer of the jejunum is an additional reason for performing gastro-jejunostomy only where it is positively indicated, i.e., by pyloric obstruction.

NOTE.—Since this article has been in the printers' hands I find a recent contribution on "The Surgical Treatment of Ulcer of the Stomach," by Einar Key, in the Nord. Med. Arkiv, Afd. 1, (Kirurgie) No. 3 and No. 5, 1907. (J. A. M. A., Dec. 7, 1907, p. 1963), in which 5 cases of peptic ulcer of the jejunum are reported from the clinic of Berg, and 1 from that of Lenander. The latter is notable, as it is the first instance in which this condition is reported as a result of gastro-enterostomy for carcinoma of the stomach.

In addition to these 6 cases, 49 are collected from the literature.

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HIRSCHSPRUNG'S DISEASE[1]

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THIS extraordinary specimen of bowel which I here present to you is the first case of its kind on record in the United States, according to the literature available and to inquiries which I have made among surgeons and anatomists. I shall not go into great details, as I intend to publish the case in extenso later on, and I should like only to touch upon the most cardinal points of the anamnesis, definition, symptomatology, diagnosis, and the anatomy.

This enormously large bowel was taken from a child two years of age. I made a correct diagnosis before operation, a point of great importance to me, as in consequence of this I believe that after the knowledge of this peculiarly rare disease has been more widely spread, more cases will be found which are traveling now from one doctor's office to another and from one dispensary to another, with all kinds of labels except the right one and subjected accordingly to all kinds of erroneous treatments.

Definition of the disease. Hirschsprung's disease or mega colon manifests itself in a persistent high grade obstipation and large distension of the abdomen which is caused by an enormous dilatation of the sigmoid flexure and of the colon. The symptoms are observed either right after birth or develop in the first months or years of life. Very rarely has an alike condition been observed in adults. The disease has terminated in by far the greater number of cases in death, which was preceded often by a colitis and a development of numerous ulcers caused through stretching of the dilated colon.

As in regard to anamnesis, the infant in this case had never been well a single day of its life, always suffering with great obstipation, the bowel movements were very rare, with even days of intervals, and then the evacuations could take place only in peculiar contorted positions of the body and the legs, attended by great efforts and pains. The amount passed at a time was unproportionately small and often accompanied with very offensive odor. From birth the abdomen had been noticed to be abnormally large and had augmented more and more in undue proportion to the general development of the body. When I saw the child at my office a few days before the operation, it was then in emaciated condition, with an expression of long lasting suffering and misery in its poor, white, faded face, out of which two dim eyes looked, tired and nervous. The bare body showed all over great retardation of development through malnutrition. Arms and legs very thin, ribs poorly covered with integument, absence of all adipose tissue, but in striking contrast to all those skeleton-like conditions of the body rose an enormously large abdomen. While looking over the abdomen a phenomenon of very peculiar kind engaged suddenly my whole attention. When one has seen this once one will never forget it. It consisted in a heaving of the abdominal wall as though an arm was moving to and fro inside of the abdomen, trying to burst through the wall, raising it six to eight inches in height. Instantly my mind reverted to a phrase of one of the German authors on the subject, "das Gewühl der Gedärme," and simultaneously the diagnosis of Hirschsprung's disease applied to it. I know of no condition in the abdomen that could produce a likeness in appearance. This "Gewühl der Gedärme" meant nothing else than the most forceful, but almost absolutely futile peristalsis of the enormously dilated and hypertrophied colon with its bag-like enlarged descending colon and still more dilated sigmoid. Anamnesis and further examination made me certain of the correctness of my diagnosis. Thus I mentioned the fact to some of my friends at the hospital, hunted up the corresponding literature in my library and showed the illustrations of Roth, Parthes to them, but the case seemed to have drifted away until some days later it presented itself for operation, upon

[1] Read before the Chicago Surgical Society, November 1, 1907.

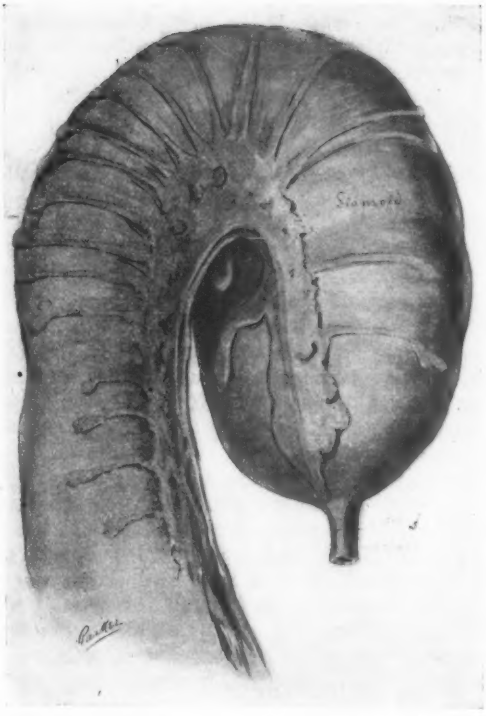

Fig. 1. Showing large bowel with normal rectum below.

Fig. 2. Entire colon. Notice U-shaped sigmoid.

which I had decided from the first moment of my diagnosis as the only possible way of perhaps doing something adequate for the otherwise hopeless patient. Another examination, previous to the operation, could not change my diagnosis. However, there was one factor which seemed very strange, namely, why the emaciated child should weigh so heavy. This point was cleared up very readily when we had the large bowel outside of the abdomen and found it full with fecal contents to such an extent that its quantity filled a pail. The heart beat was two ribs higher up. The liver could not be lined out, as the full bowel had pushed it very high up under the ribs, so that its upper surface was turned down toward the diaphragm. Respiration was very frequent and impaired, pulse very thin and rapid; the distended bowel encroaching very strenuously upon the thoracic cavity and its organs, pushing the diaphragm up to its utmost limit and filling out its whole dome. When through a median koliotomy the abdomen was opened, the largest part of the bowel, which later on proved to be the sigmoid, forced its way out to some extent. It gave the appearance of an hypertrophied, enormously large stomach of an adult, occupying the entire right side from the sternum to Poupart's ligament and from the right crest of the ileum to the left pararectus line. The colon descendens, which also had been transformed into a bag-like shape, was situated in the left side, filling out the space from the arch of the ribs to the left spina ilei and formed with the sigmoid flexure the figure of an inverted letter U. The dilatation of the bowel was not limited to the sigmoid and descending colon alone, as in other cases recorded, but involved to quite an extent, while not all over as colossal in dimensions as at the sigmoid, the whole colon clear up to the ileum. The surface of the bowel was shiny-bluish, and all the haustra were effaced. The muscular coat of the bowel is heavily hypertrophied. The dimensions are as follows: While

in the adult the length of the colon measures about 130 to 145 c.c.m., in this case we find it 154 c.c.m.; sigmoidal sac 21 c.c.m. in diameter; colon descendens 15 c.c.m. in diameter; colon transversum on several places 20 c.c.m. in diameter; the rectum 2 c.c.m. in diameter and ileum 1 c.c.m. in diameter. The mesentery was abnormally long and the blood vessels in it were very large. In regard to the inverted letter U-shaped form, I would like to call your attention to what happens when I inflate the collapsed bowel with air. You will readily observe that the nearer we come to filling the bowel to its full capacity, the more pronounced this distinct U-shape develops, until finally the two "Schenkel" arms of the bowel assume such a close approximation that they lie in contact apposition.

The sigmoid, with its colossal circumference, abruptly narrows at its distal end to assume the proportions of the normal rectum. The effect of the sudden termination is not unlike a child's toy balloon, the rectum being the small opening by which it is inflated. The small rectum, with its thin walls, is in very marked distinction to the directly above enormously enlarged hypertrophied sigmoid, and it is here at this junction where our exploring bougie stopped and could not be carried any further up into the bowel during examination. Without going into any far-off speculation or enumerating the different theories as to the etiology, development, and the mechanism, I should like to draw a picture of what perhaps happens when the sac-like enlarged sigmoid is full of contents, bearing in mind that the rectum is well fixed to the bone while the abnormal sigmoid, furnished with a very long mesentery, is permitted quite a range of motion. Those two points are paramount in judging the mechanical circumstances, and, therefore, I like to differ from the other authors on their theories concerning this point, especially the valve-like projecting part of the sigmoid.

The large sigmoidal bag, when filled with fecal matter, will sag downwards and outwards, that is to say, towards the right side and backwards, consequently it will pass pararectally downwards for reason of gravity and by permission of the long mesentery; and then arrived at the end of its allowance of excursion on the part of the mesentery, it will take a turn around its own axis to some degree, and thus twist and kink at the portion of the junction of the rectum which itself, being normal, is fastened in place stationary and cannot follow the axis motion of the lumen of the enlarged bowel. In consequence of that, the lumen of the rectum is from partially to entirely occluded. As in regard to the treatment, I stated before that the child had been in an emaciated condition and that our interference would be a last resort. I had most of the different propositions of the various authors and their experiences well in mind and intended at first to simply establish a præternatural anus, but when I encountered additional enlargements of the same size as the sigmoid in the colon transversum, and even some in the ascending colon, attached to an abnormally long mesentery, I forsaw further danger from kinking and obstruction and obstipation. I call your attention to the different parts of enlargement, especially in the transverse colon, with points of constriction, of which one in particular is very pronounced, therefore I decided to follow Neugebauer's advice: "The exclusion of all diseased parts of the colon and anastomosis distally from the occasionally present valve occlusion ('Ventilverschluss') may be named as requisitions for a successful operation." The whole colon was diseased, consequently I removed it in its entire length up to Bauhin's valve, including the appendix. Then I performed an end to side anastomosis between the ileum and the rectum, which was carried out very rapidly and easily, as the mesentery of the ileum allowed full approximation of the bowel.

The patient did splendidly after the operation. There was no vomiting at any time. Patient took nourishment the second day and was quite bright, sleeping at intervals, with normal pulse and normal breathing. Gases passed freely, so everything went along very satisfactorily for 32 hours, when with a sudden gasp the patient turned to the side and died without warning. Cause of death, embolism.

LACERATIONS OF THE PERINEUM[1]

Their Causes, Formation, and Primary Repair, with Report of Forty-Eight Illustrated Cases

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THE subject of perineal lacerations and repair is one which has been debated amongst medical people for many years, and the more debated, the more obscure the subject has become. The multitude of operations which have in recent years been exploited is evidence of the lack of uniform appreciation of the underlying causes, processes, and mode of repair of these wounds.

Although modern gynecologists have been most successful in the treatment of these conditions, the possibility of their successful treatment has long been known. The first historical reference to the subject is found in an early work supposed to have been handed down by tradition and edited by an unknown author who states that Tortula, a midwife attached to the school of Salernum, who lived in the eleventh century, cured a laceration of the perineum by operation — "Postmodum ruptura intra anum et vulvam tribus locis vel quatuor suimus cum filo de serico" (1).

Ambrose Paré (2) was another of the early investigators of the subject and is credited with having performed the operation. He reports a cure of two cases, but does not state that the operation was done immediately after labor. He gives directions as follows: "But if through the violence of extraction the genital parts are torn, so that the two cavities, the rectum and vagina, are torn into one, the tear must be stitched up, and the wound cured according to want. I have thus cured two women living in Paris."

Various other investigators followed Paré, amongst them his pupil, Guillemeau, (3) who operated upon one case of complete rupture of the perineum six weeks after labor. He pared the edges of the old cicatrix and used one figure-of-eight and two interrupted sutures. The operation was a success. Others who performed the operation for complete tear were De La Motte, Morlanne, Saucerotte, Noël, and Dupuytren in France, Rowley in England, and Osiander and Dieffenbach in Germany. Dieffenbach (4) wrote extensively upon the subject of complete perineal tear and followed the plan of making lateral incisions at each side of the perineum after suturing the recto-vaginal septum. In 1837 he advised the primary repair of all lacerations of the perineum, including first and second degree tears.

Amongst American surgeons Mettauer (5) of Virginia published a report of a successful operation for complete tear six months after its occurrence. He used sutures of lead and fastened them by twisting.

Roux (6) wrote extensively upon the subject and published many successful cases of complete perineorrhaphy. He was an earnest advocate of the operation.

Amongst those who did primary operations for incomplete tears of the perineum were Bayer (8) in 1823, Churchill (9) in 1824, and Williams (10) in 1827, while Alcock (11) performed the intermediate operation for incomplete laceration in 1820.

The secondary operation for laceration of the second degree tears also was first done about this time. Fricke (13), in 1835, has done the operation four times with three successes. Nick (14) also reported in 1838 that he had done two operations for incomplete tear of the perineum. Baker Brown (15) was, however, the surgeon who did most to bring the operation into general use and encouraged others to study the subject of perineal injuries. In 1866, Baker Brown had done 112 operations upon the perineum. His work stimulated Savage (16) to excellent researches upon the anatomy of the perineum, which have remained classic in gynecological literature.

Following after these were Hegar, Sims, Agnew, Emmet, A. Martin, and Lawson Tait.

[1] Read before the New York Academy of Medicine on October 25, 1907.

Of these, Emmet (17) has been the greatest contributor toward the subject and recognized that the torn muscles and fasciæ caused a loss of support to the pelvic floor. His operation is the one commonly performed at the present time.

Since the time of these masters, a multitude of new operations have been devised to restore the anatomical support of the pelvic floor and close the perineal wound, caused by descent of the head at labor. All these operations have as their aim the intimate approximation of the edges of the torn fasciæ and muscles. To this end, in secondary operations, many forms of denudation of the vaginal mucous membrane have been exploited. The majority of these attempt the excision of the scar tissue of the old wound and the restoration of the torn muscles and fasciæ.

Without a proper appreciation of the causes, processes, and forms of perineal rupture, it is useless to attempt to judge the value of each modification of the various operations. With this end in view I have made sketches of forty-eight consecutive perineal lacerations at the time of labor and have noted the most evident and directly causative factors. These lacerations occurred in 100 women, of whom 90 were primiparæ. This gives a percentage of occurrence of forty-eight percent, which is within Williams' estimate of 45 to 58 per cent. Every wound of the mucous membrane other than a small tear of the fourchette has been reckoned in the series, none over 1.5 cm. in length have been excluded.

The various causes of perineal laceration are usually cited as follows: 1. Too rapid expulsion of the child, so that tearing of the perineum instead of stretching results; 2. Relative disproportion between the presenting part and the parturient outlet; 3. A faulty mechanism of labor whereby the largest circumference of the head passes the perineal ring; 4. The use of forceps.

Rapidity of delivery is without doubt the most frequent cause of perineal laceration. This is particularly seen in those cases of precipitate delivery where the head comes through the birth canal rapidly and impinges upon the perineum with almost the force of a blow. This rapidity of advancement of the head is sometimes seen in cases of contracted pelvis, where strong uterine pains are required to force the head through the bony pelvis, with the result that the less resistance of the soft parts does not retard its way. The quick descent of the head was also seen in one case (No. 25), where the membranes had remained intact until the head had come through the brim; when the membranes ruptured, the head was advanced with great rapidity, causing a laceration in a multipara with a comparatively lax outlet.

The passing of the head through the perineal outlet should undoubtedly be retarded, until the parts have softened and stretched. A preliminary digital stretching is most useful in primiparæ, although often a painful procedure. It can, however, be done during the labor pains and is a means of stimulation of their force and frequency.

A frequent cause of perineal laceration is the pressure of the head upon the perineal body and the lack of retraction between pains. The maternal parts become bloodless and tense, and tear readily with further descent of the head. An additional factor in the production of this condition is the attempt to control expulsion by pressing the taut perineum against the sinciput. This wounds the perineum and aids in the production of the anemic condition. The advancement of the head should be controlled without making any pressure upon the perineum.

Strong pains are a definite factor in the production of perineal injuries, but may be readily controlled by chloroform.

Relative disproportion between the presenting part and the parturient outlet is commonly thought to be one of the main causes of perineal injuries.

In any attempt to estimate the size of the fetal head in relation to the perineum, it should be decided which is the greatest diameter of the fetal head to engage in the perineal ring. In this study, it will be considered to be the occipito-frontal diameter, which comes into relation with the perineum by the final extension of the head. It is the diameter most capable of accurate measurement and gives a more dependable estimate of the size of the fetal head than do the suboccipito-bregmatic

or biparietal diameters. The various circumferences of the fetal head offer too much possibility of error in measurement to make them useful as indications.

Therefore, in attempting to estimate the size of the presenting part in its relation to the size of the perineal ring, the greatest engaging diameter, the occipito-frontal, is taken as a criterion. However, as the size of the head increases in direct proportion to the weight of the child, the increase of weight in its relation to perineal lacerations is also considered. This increase in the size of the fetal head in proportion to the weight was shown to be constant in 100 cases studied in its relation to intra-uterine cephalemetry (19).

In this series, the 48 perineal lacerations may be divided into two classes: 1. Those not involving the muscle, and 2. Those involving the muscle of the perineum. Of those not involving the muscle, there were 21. The average weight of the 21 babies was 3,310 grammes, and the average occipito-frontal diameter was 11.27 cm. The 27 cases of lacerations involving the muscle had children averaging 3,550 grammes, and with an average occipito-frontal diameter of 11.75 cm. The average weight of 100 babes, of whom these 48 cases here reported are a part, was 3,300 grammes, and the average occipito-frontal diameter was 11.40 cm. Therefore the result may be summarized:

	O.-F. Diam.	Weight.
21 cases of laceration not involving muscle	11.27	3,310 gm.
27 cases of laceration involving muscle	11.75	3,550 gm.
100 cases, including 48 cases of laceration	11.40	3,300 gm

From this summary it will be seen that the babies causing lacerations not involving the skin were of average weight, but of less than average size of head; while those causing lacerations involving muscle were of more than average weight and size of head. However, the slight increase in weight of two hundred grammes (7 oz.) can hardly explain the causation of the lacerations in view of the fact that the heads were but slightly larger than average. Nor will the fact that, in 21 cases of minor lacerations, the fetus was of average weight and less than average size of head explain the causation of these tears.

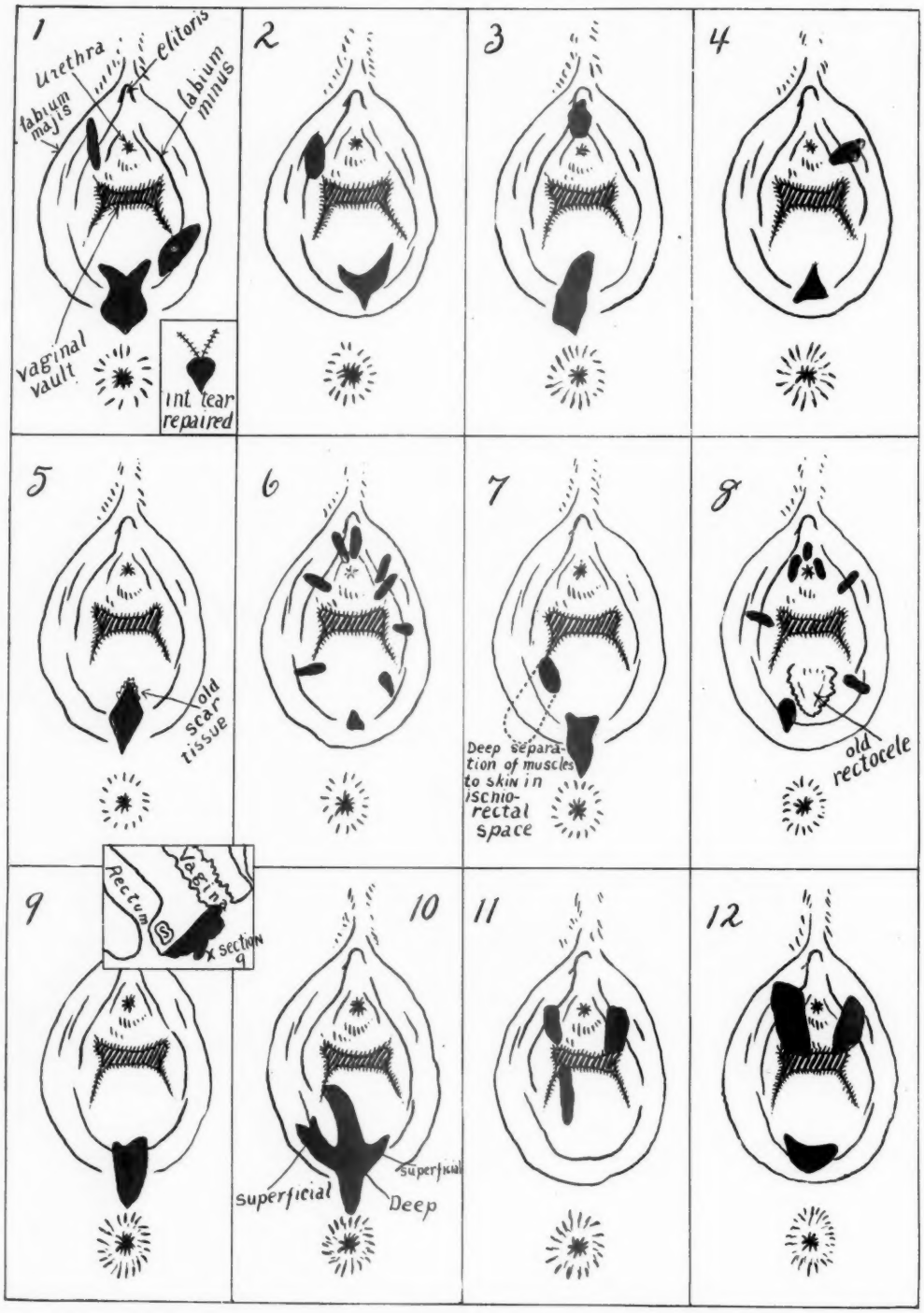
The causation of perineal lacerations, while undoubtedly influenced by considerable increase in size of the fetal head, does not depend to any extent upon this condition. It must, therefore, depend more upon the size and condition of the perineum itself than upon the size of the fetus and fetal head. The disproportion may be due to firmness of fiber and rigidity of perineal structure.

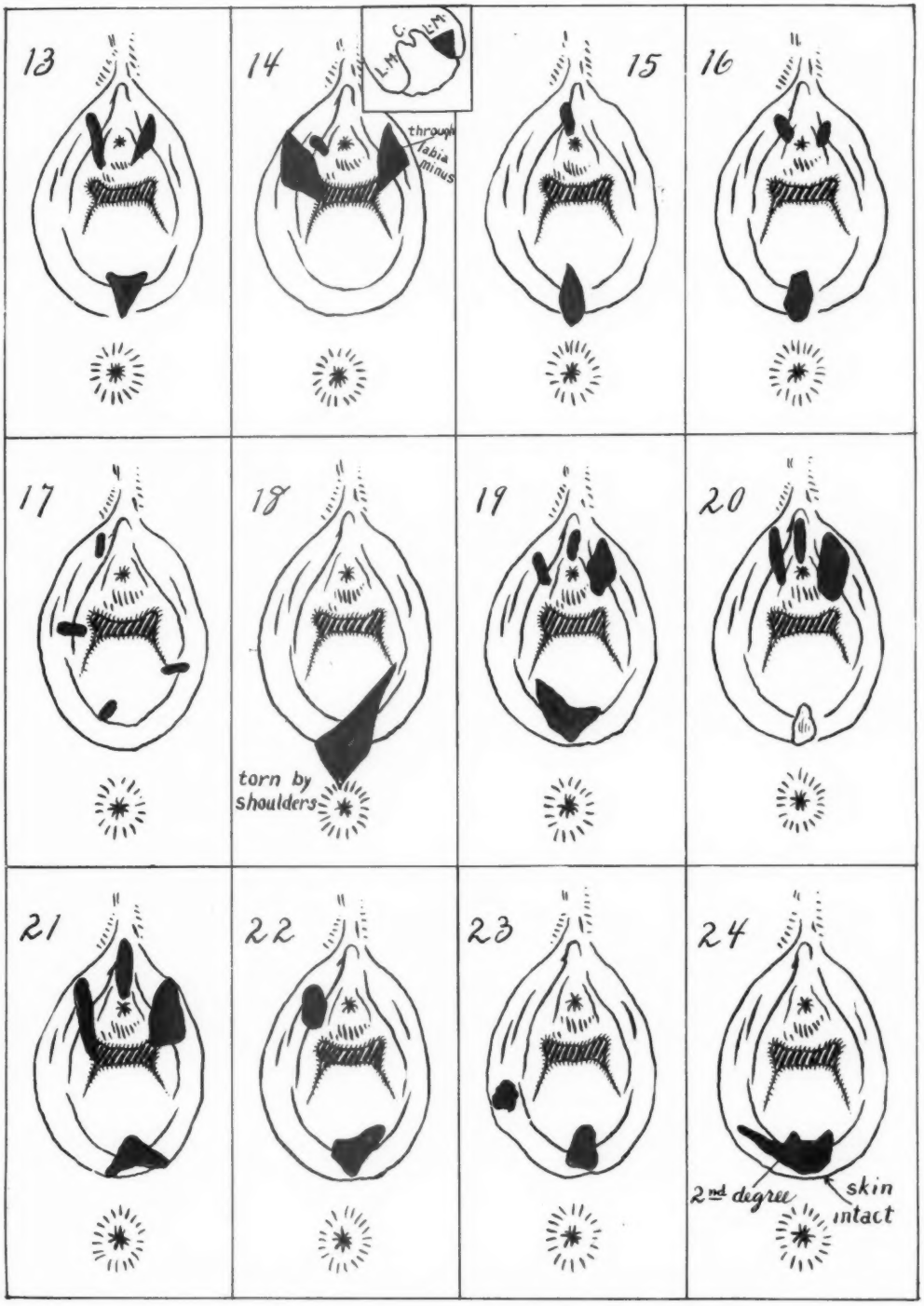
Faulty mechanism of labor is undoubtedly the cause of a small percentage of lacerations, but this has an influence in but a small number of cases. Amongst them are those cases where the occiput does not present under the symphysis as in delivery by face to pubes. Whenever the flexion of the head is not sufficient, a larger diameter than necessary must pass the perineal ring. If flexion is good, the occiput may pass under the pubic bones before the occipito-frontal diameter engages in the outlet.

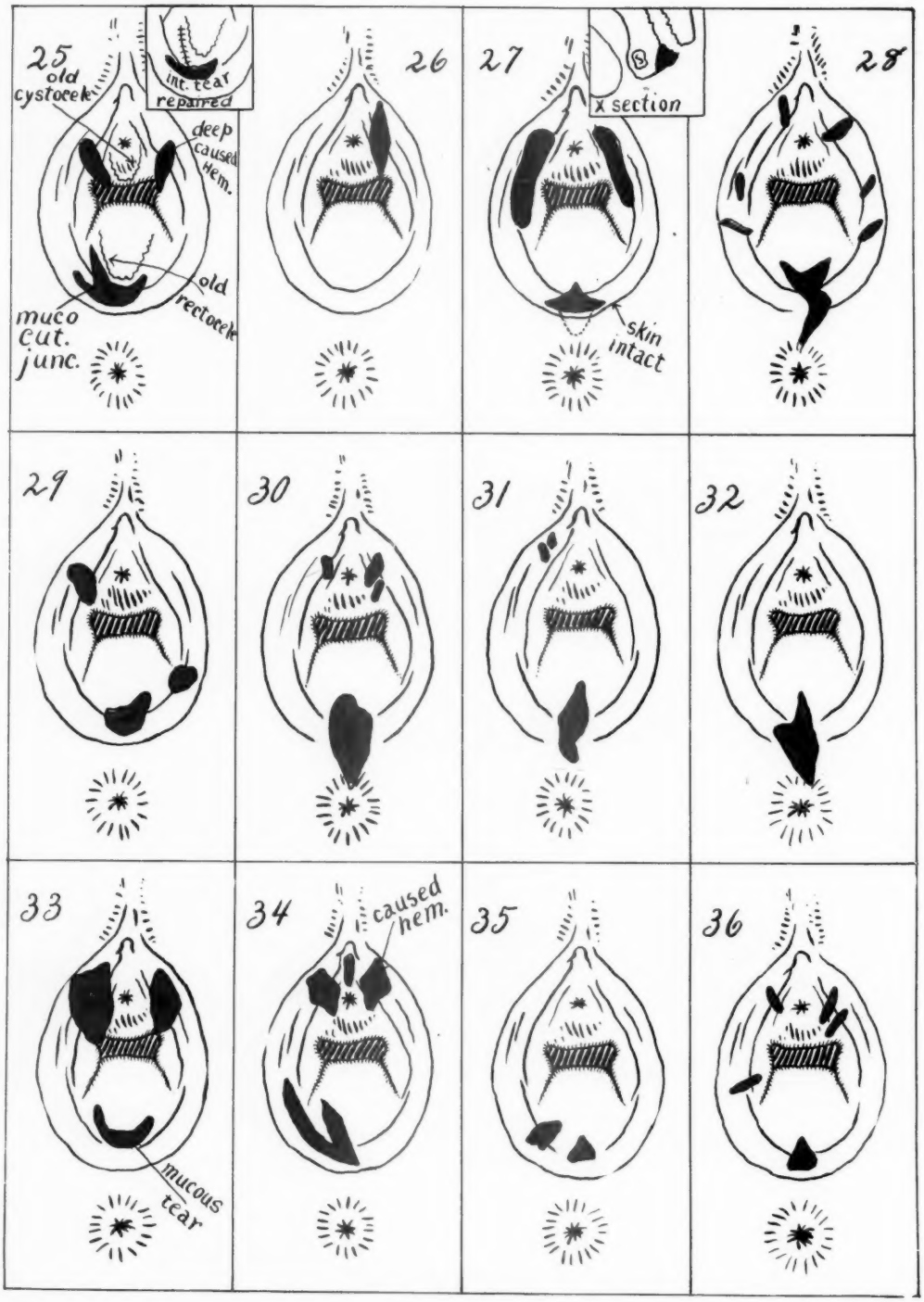
In breech deliveries the reverse must ensue, i. e. the occiput remain within the ring and pivot under the symphysis, allowing the sinciput to engage first in the ring.

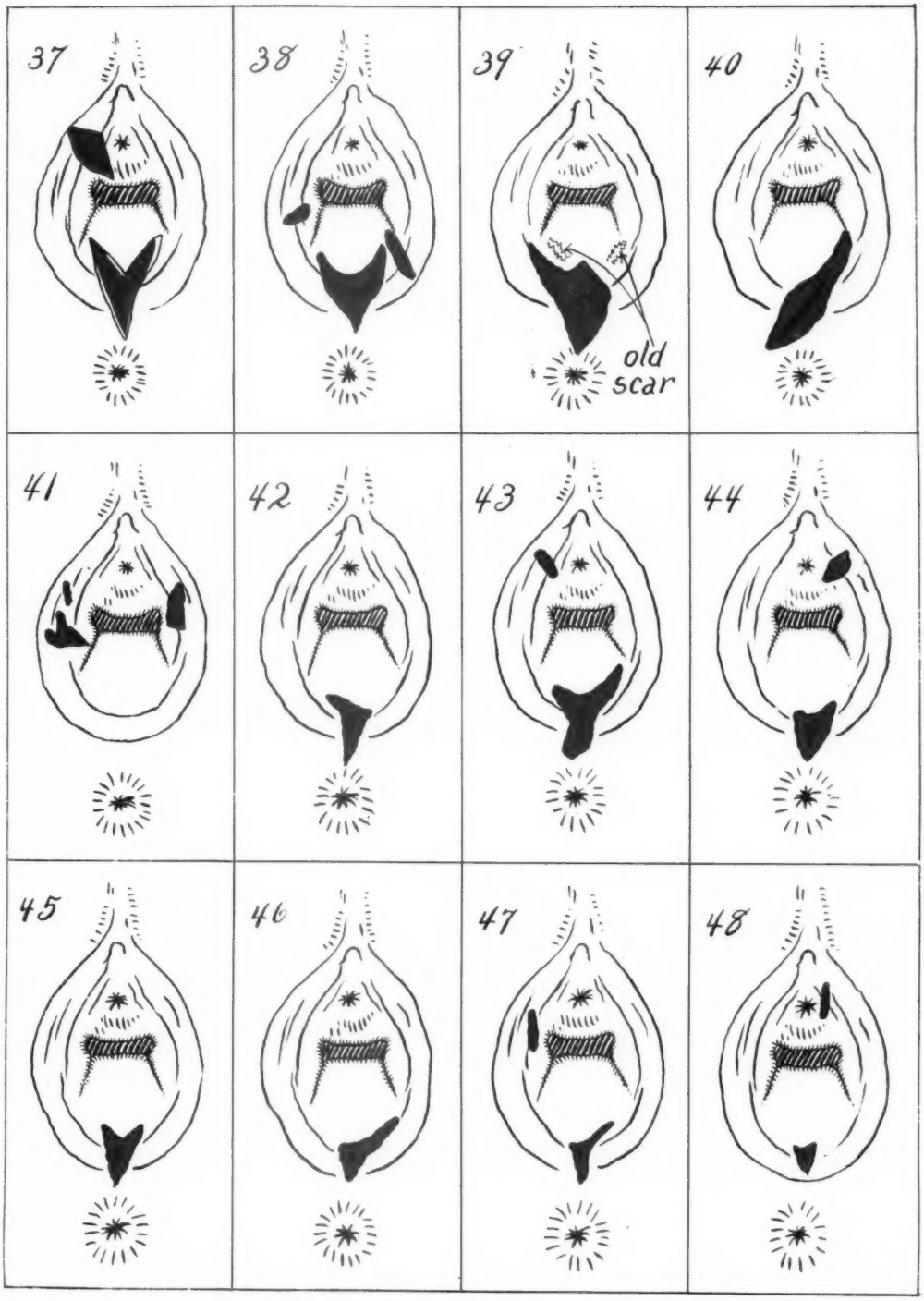
The use of forceps as a causative force is one which varies very much with the methods of different operators. The harm they cause depends upon — 1. The kind of forceps employed; and 2. Upon whether the operator delivers the head with the forceps or not.

Forceps with long blades of the type of the Simpson forceps may cause laceration of the perineum in two ways. First, directly on a backward pull by the breadth between the shanks where they join the handles, which unduly stretches and wounds the outlet at a level with its greatest frailty, the posterior fourchette. Second, the blades themselves do not closely approximate the fetal head, and the edge of the blade extending beyond the head, impinges upon the vaginal floor and is forced into the tissue. This condition is quite common when attempts are made to deliver the head through the ring without removing the forceps. When the handles of the forceps are turned upward in order to extend the head, the blades, not fitting snugly over the head, but grasping the parietal pro-


1
Urethra
Clitoris
labium majus
labium minus
vaginal vault
int. tear repaired
2
3
4
5
old scar tissue
6
7
Deep separation of muscles to skin in ischio-rectal space
8
old rectocele
9
Rectum
Vagina
S
x section 9
10
superficial
Deep
superficial
11
12


13
14
C.
L.M.
L.M.
through labia minus
15
16
17
18
torn by shoulders
19
20
21
22
23
24
2nd degree
skin intact


25
old cystocele
int. tear repaired
deep caused hem.
old rectocele
muco cut. junc.
26
27
X section
skin intact
28
29
30
31
32
33
mucous tear
34
caused hem.
35
36


37
38
39
old
scar
40
41
42
43
44
45
46
47
48

cesses firmly, turn upon these eminences as upon a pivot, with the result that the point of the blade extends beyond the head and impinges upon the pelvic floor. Further descent of the head drives the point into the tissue and starts a laceration. In such conditions it requires but a small beginning of a tear in the mucous membrane to result in a large laceration.

The secret of success in the prevention of perineal lacerations is to keep the mucous membrane intact: once the mucous membrane is ruptured, as by the point of the forceps' blade, the head stretching these tissues often causes a severe tear, while, if the mucous membrane is kept intact, delivery is often made successfully through most rigid perinea. In other words, the tissues are like cotton, in which, if a tear is once begun, it may be easily extended. Such was the result in one case (No. 7), here reported, where a small laceration was caused by the points of the Elliott forceps and the muscles split so that the finger could be thrust between the muscular planes to the skin of the ischiorectal space.

The secret of avoidance of tears in forceps delivery is the use of proper forceps and the removal of the forceps as soon as the head can be controlled by the hand.

The author has made trials by practical use of many models of forceps and has finally come to use solid blade forceps after the Tucker-MacLane model. These forceps fit the head well, cause little traumatism to the vagina and perineum, and are easily applied without causing abrasions or injury. The best types of these forceps are the Cragin and the McDonald models, made by Tiemann, New York. These forceps may be applied and the head drawn down until it can be controlled by pressure upon the forehead between the coccyx and the anus. No attempt should be made to deliver the head without first removing the forceps.

With the acquirement of skill and the use of proper forceps, there is no reason why there should be more lacerations directly due to forceps in instrumental deliveries than in non-instrumental deliveries. The head may be delivered as slowly and as much care taken of the perineum as in non-instrumental deliveries.

A frequent cause of perineal laceration which is often credited to the forceps operation is the traumatism done by the prolonged stay of the head at the outlet and the pressure caused by the ineffectual labor pains pressing the presenting part against the pelvic diaphragm. In those cases (Nos. 19, 30, and 38) in which the head had remained some time upon the pelvic floor, the resulting lacerations were extensive and deep; the tissues were edematous and fragile, being repaired with difficulty, as the sutures cut out. The presenting head should not be allowed to remain upon the perineum without advance for more than an hour and a half, and usually not that time.

Posterior positions are also often spoken of as a cause of perineal lacerations and undoubtedly predispose to this condition. Forceps rotation is dangerous with the old style long fenestrated forceps. The vaginal mucous membrane may be stripped off, as was the result in one case (No. 32), reported here. However, with the modern solid blade model, the operation of rotation by forceps is easy, and there is but little danger of damage to the mucous membrane.

Scar tissue in the perineal ring as a result of old wounds or previous perineorrhaphies makes the perineum more easily torn. The fibrous scar tissue has not the elasticity of normal perineal structure, and rupture is apt to occur at this spot. In several cases of multiparæ (Nos. 5, 8, and 39), the perineal outlet was of fair size, yet a laceration occurred at the site of the scar.

It is frequently stated that the shoulders in head presentations often cause lacerations of the perineum. Such is not my experience. I have never seen a laceration from the shoulders alone; but large shoulders quite frequently increase the extent of a tear which was begun by the head. The phenomenon already referred to holds good that a tear once begun readily extends: such was the result in one case (No. 18) in this series.

For the purpose of consideration of these lacerations, they may be divided into tears of the anterior and posterior part of the perineal outlet. The posterior tears may again be divided into — 1. Tears not involving the

muscle, or minor tears; 2. Tears involving the muscle, or major tears; and 3. Tears involving the sphincter.

The relation of the skin surface to the lacerations has no bearing upon its depth or gravity. Ofttimes a laceration may not involve the skin surface, yet extend deep into the muscle of the pelvic floor. Such cases are Nos. 7, 24, 27, and 36. There may be extensive injury to the pelvic muscular support without any rupture of skin surface.

Minor lacerations occurred 21 times. Forceps were done 4 times. The average weight of the babies, as before stated, was 3,310 grammes.

Major lacerations occurred 27 times. There were 11 forceps deliveries. The average weight of the babies was 3,550 grammes.

No cases of sphincter tear occurred in this series. The author has repaired a number of sphincter lacerations in obstetrical work and has had two occur in his own hands. One of these was due to an ill-directed and ill-controlled forceps traction when the head was near the perineum. The head came down suddenly with the last traction, and, as the direction of the traction was wrong, ruptured the perineum. The other case was one in which, while an assistant delivered a case of placenta prævia under my direction, the arms became extended in the breech extraction and caused delay, so that I was compelled on account of the safety of the child to extract the head very hurriedly. The head came through the pelvis so quickly that the extension of the face was not done. The chin caught against the perineum and caused a sphincter laceration. Both of these tears should have been prevented. Most sphincter lacerations are without excuse, and, with proper care, should not occur.

In a consideration of these 48 cases, it will be seen that lacerations of the anterior portion of the perineal ring have occurred 32 times. These lacerations occurred in the region of the vestibule, through the labia minora and around the urethral orifice. They frequently caused hemorrhage. In one case (No. 14) the labium minus was torn completely through, as if cut with scissors. These anterior tears have but seldom been referred to (save by Bar and

TABLE OF CASES

No.	Para	Pelvis	Occ. Fr.	Wt.	Remarks
1	I	Normal	12.75	3600	
2	I	normal	12	3500	
3	I	normal	11	3300	Precipitate. Age 39.
4	I	normal	11.25	3400	
5	II	sl. contr.	11.5	2900	Scar of old operation caused rigidity.
6	III	sl. contr.	11.75	3900	
7	I	normal	11.75	3450	Med. forceps. Muscle split begun by sharp edge of forceps.
8	II	normal	12	3950	Old scar tissue.
9	I	contracted	11.5	3050	High forceps; torn after removal.
10	I	contracted	11.75	4000	High forceps, dry labor.
11	I	contracted	11.25	2850	
12	I	normal	11.25	3100	Low forceps.
13	I	normal	11.25	3650	
14	I	normal	10.50	2950	
15	I	normal	11.25	3400	
16	I	sl. contr.	10.75	2800	
17	I	normal	11.25	3600	
18	I	sl. contr.	11.50	3700	Tear increased by large shoulders.
19	I	normal	11.75	3800	R. O. P. Head on perineum 1½ hours, tissues contused.
20	I	normal	12	3750	
21	I	normal	11.75	3600	Low forceps.
22	I	normal	12	3500	
23	I	normal	11.5	3025	
24	I	normal	11	2950	Second degree. Skin intact.
25	II	normal	10.75	3200	R. O. P. Head came down quickly when membranes ruptured.
26	I	normal	11	3200	
27	I	normal	10.5	3100	R. O. P. Second degree. Skin intact.
28	III	contracted	12.25	3800	Med. forceps.
29	I	normal	11.5	3650	Low forceps.
30	I	sl. contr.	10.75	3000	Low forceps. Head on perineum 1½ hours.
31	I	normal	11.25	3500	
32	I	normal	11.25	3300	Med. forceps. L. O. P. Caused by attempts at rotation.
33	I	normal	11.25	3100	R. O. P. Low forceps, age 44.
34	I	normal	10.30	3500	Very rigid.
35	I	normal	11	2650	
36	I	sl. contr.	10.75	2900	
37	II	normal	11.5	3800	Med. forceps. Dry labor.
38	I	normal	11	2650	Low forceps. Head on perineum 1½ hours.
39	II	normal	11.50	3800	Low forceps. Old scar of previous repair.
40	I	normal	11.25	3500	Med. forceps.
41	I	normal	12	3300	
42	I	normal	11.75	3200	
43	I	normal	11.50	3400	Med. forceps.
44	I	normal	11.50	3500	
45	I	sl. contr.	11.25	3400	
46	I	normal	11.25	3000	
47	I	normal	11	3000	
48	I	normal	11.25	3200	

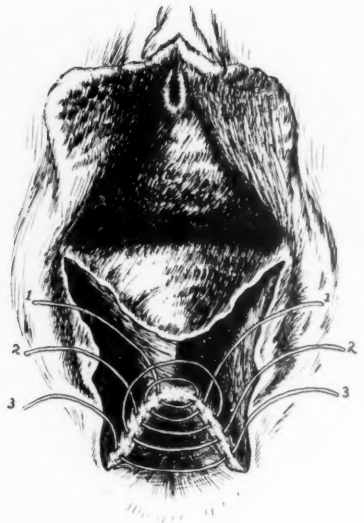


Fig. 5.

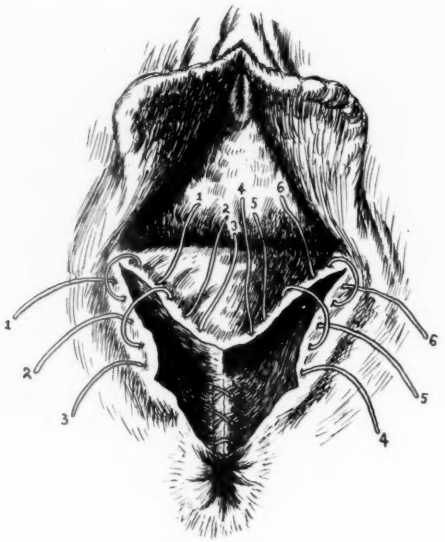


Fig. 6.

Hirst) and are of considerable importance, as they often bleed profusely.

A scrutiny of the more severe tears of this series will show that the lacerations are usually lateral. Those which occurred in the midline did not extend centrally up the vagina, but deviate to one or other side, or separate to form a Y. The only lacerations which extended centrally up the vagina were those in which the perineum was the seat of old scar tissue which altered the normal relation of the fibers.

Thus it will be seen that any secondary operation which considers purely the middle line of the vagina does not attempt to repair the original trouble and is ineffectual in restoring the parts to their previous condition. The Emmet operation, as modified by Noble, best completes the exact anatomic restoration. It may be modified to suit any of the more severe lacerations shown in these pictures.

These lacerations were all repaired immediately after labor. The operation may be delayed 24 to 28 hours, if the woman's condition is poor, but should not be delayed longer, as the pyogenic organisms, constantly in the lochia, may cause infection of the wound. If it is necessary to delay longer, the laceration should be left for complete cicatrization, and a secondary operation done. The intermediate operation in the stage of granulation is one fraught with danger. Freshening the granulating surfaces of an infected wound of the perineum may cause a severe intoxication and open avenues of infection.

The technique of the operation was as follows: First, if there was a sphincter tear, the rectum was sutured by a modified Lauenstein suture with fine chromic catgut and a small needle. These sutures pass in and out close to the margin of the gut upon the vaginal side without penetrating the rectal mucosa. They are introduced in a figure-of-eight and tied not overtightly. The remainder of the operation, save for joining the sphincter ends, is the same as for a sphincter or major tear.

The mucous membrane is sutured with No. 2 chromic catgut, with a Kelly's needle. These needles should be rather heavy; a useful type, with a large (Lister's) eye in the side, is that sold by Codman and Shurtleff of Boston. The needle should be inserted 1 cm. from the edge of the mucous membrane and come out at the bottom of the laceration; be reinserted and emerge 1 cm. from the opposite edge (Fig. 6). Full bites of tissue should be taken.

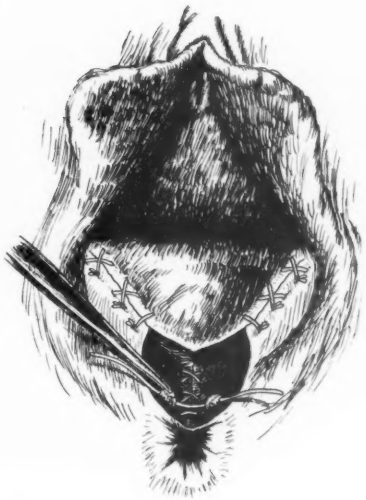


Fig. 7.

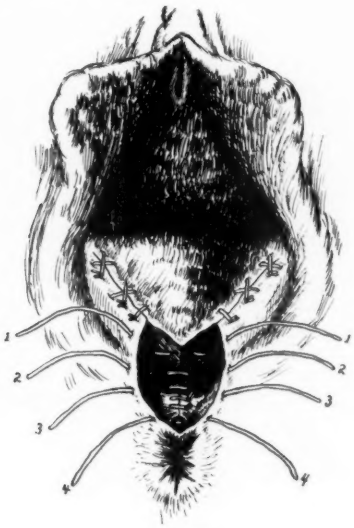


Fig. 8.

The sutures here are also passed as figure-of-eight. These double stitches save time, lessen the possibility of infection along the suture line and properly coaptate the parts. Care should be taken that the sutures completely close the sulci and do not connect them into closed gutters for the passage of discharges.

Twelve-day chromic gut is used and lasts in the vagina from six to ten days. Plain catgut is not of use in the soft succulent tissues of the postpartum passages, as it is absorbed too rapidly. No. 3 plain catgut lasts on an average three days under these conditions.

If the laceration is complete, the sphincter is now brought together by two sutures of No. 1 chromic catgut on a small needle. These sutures are buried (Fig. 7).

The next step in the operation is the closure of the external or skin surface of the laceration: this is done by silkworm gut sutures, with the Kelly needle. The sutures, as passed through one side of the wound, come out at the bottom and, if necessary, pick up any redundant tissue, and are reinserted to come out about 1 cm. from the skin surface. These sutures are drawn sufficiently tight, to bring the edges of the wound firmly together. It usually requires from three to five of these sutures. None should be tied until all are in place, the effect of each suture upon the wound by crossing the ends of the suture being to pull the edges of the wound together. When all are inserted, these sutures are tied.

Attention is then directed to the mucocutaneous junction at the level of the hymen. Here two or three fine chromic sutures are usually required, to effectually seal the wound.

The secret of success and primary union in this operation is to have no opening or gap in the line of the wound for the entrance of the lochial discharges which have been proved always to contain pyogenic organisms. These last chromic gut stitches effectually block a very commonly left gap which would permit the infiltrating discharge to obtain entrance to the lower part of the wound. These stitches correspond to the "crown-stitch" of Emmet's operation and restore the fascia in that plane as well as add to the cosmetic result.

The operation is done in three steps: 1. Suturing the mucous membrane; 2. Suturing the external tear; and 3. The "crown-stitches."

The anterior lacerations were all repaired with fine plain catgut. The tissues here are not so succulent, nor are they so exposed to discharges, as to require chromic gut. The difficulty in the repair of these anterior tears is to avoid puckering and to get a straight line of

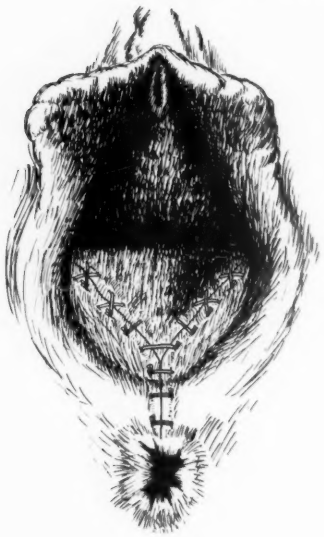


Fig. 9.

union. This is best done by beginning the continuous suture at one end of the tear and tying it. This tied end is used as a tractor and the suture continued as a "half-hitch" suture, i. e., after every bite of the needle the catgut is passed underneath the last stitch, as the tops of flourbags or bales are sewn. The suture is thus continued to the end, leaving a straight wound.

All these cases healed up by primary intention. One, in which plain catgut was used, had some separation and infection of the vaginal part of the wound. The sphincter tears, sutured by this method, and with fine chromic gut buried in the sphincter muscle, healed perfectly.

The aftercare consisted in keeping the women in bed for ten days. No douches were given, except on other indications. The silkworm gut sutures were removed in from ten to fourteen days, as the condition of the wound demanded. The women were often allowed up after ten days with the sutures in place, and about the house a day or so before their removal.

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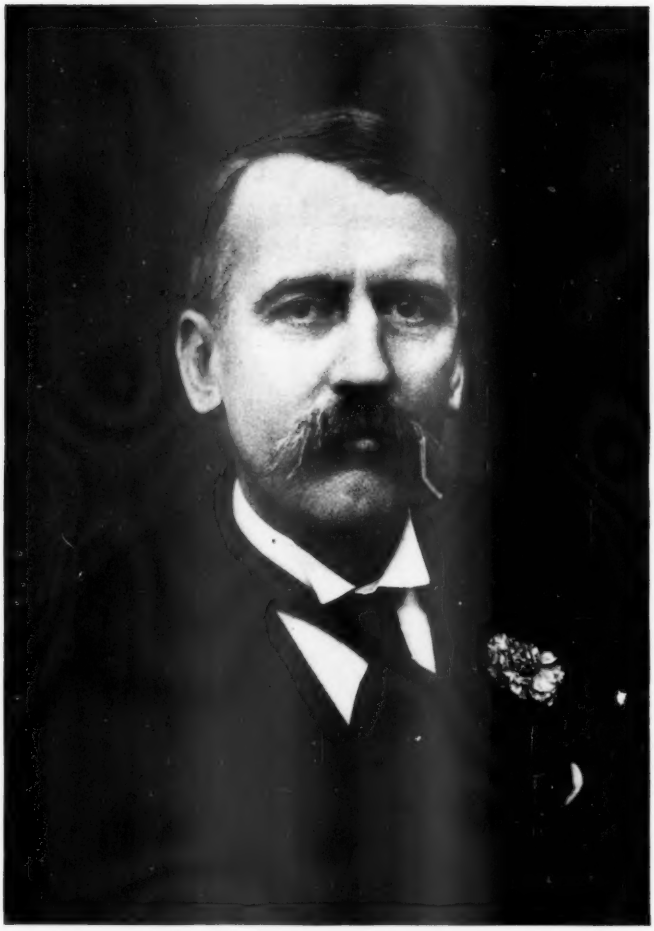

JOHN B. DEAVER, M.D.

DEPARTMENT OF
NICHOLAS SENN FESTSCHRIFT

THE MEDICAL AND SURGICAL TREATMENT OF GALL STONES, THEIR SCOPE AND RELATIONS

By JOHN B. DEAVER, M. D., Philadelphia, Pa.

INTRODUCTORY

WE meet to-night to do honor to one of the pioneers of American Surgery. Dr. Senn has always been in the forefront of his chosen profession. *He* has shown the way, others have followed. The wide range of his labors is shown in his numerous and valuable contributions to the literature of surgery. His text-books still remain classics, his articles have always shown close observation and clear reasoning.

The most widely separated fields of practical and experimental research he has made his own. The surgery of the intestines and the pancreas engaged his attention at a time when the technic of intra-abdominal operations was in its infancy. His studies on tumors and tumor formation began more than twenty years ago and still challenge our attention. At the same time, Dr. Senn did not neglect other branches of surgery and medicine. Traumatisms and inflammations of bones, and the tuberculous process in all parts of the body engaged much of his time as a practical surgeon and clinician, while his experimental researches on air embolism and the cicatrization of blood-vessels testify to his interest in the more theoretical studies, of which he has always been an ardent defender.

Following a notable series of monographs come Dr. Senn's larger works. The high standard which he has set for himself has not been lowered in these, and they also will remain enduring monuments to his fame.

And with all this work Dr. Senn has found time to give us a series of medical travel pictures almost unique. His journeys have taken him to Europe, to the Arctic regions and to the Tropics. They have taken him to the quiet of far-off islands and to the turmoil of war in Cuba and Mexico. And on each occasion the medical world has been enriched by the thoughts and impressions of a most observant traveller, written in a style which holds attention and compels understanding.

It is by such labors as these that Dr. Senn has contributed much, not only to our fund of knowledge, but also to our breadth of view. And it will be my endeavor this evening to follow in some measure his footsteps, by attempting to smooth some of the difficulties of a much misunderstood subject, misunderstood generally, not because of ignorance, but because of narrowness of view. It is:

THE MEDICAL AND SURGICAL TREATMENT OF GALL STONES, THEIR SCOPE AND RELATIONS

The rise of surgery in the last two decades has brought many conditions, formerly left to the internist alone, into the sphere of surgery. Some, such as appendicitis and carcinoma of the gastro-intestinal tract, are by common consent ailments of a purely surgical character. Others are still upon the border- ine.

Of the latter class, cholelithiasis is perhaps one of the most conspicuous examples. While the ideal treatment of gall stones is undoubtedly by surgical procedure, it would be folly to assert that all cases should be subjected to such treatment without delay.

Internists and surgeons have indulged in many bitter arguments and discussions on this score, each failing to realize that both have places to fill. The work of the one must supplement and at the same time be guided by that of the other. It is often only by careful observation and discrimination in individual cases that a choice can be made between the two modes of therapy; and an adequate comprehension of the relations of medical and surgical treatment of gall stones lies at the bottom of a sensible use of either.

One of the great strides in an understanding of gall stones brought about by modern surgery has been in the demonstration of the living pathology. While clinicians have been studying the symptomatology, and pathologists have carefully investigated the gross and minute pathology in the cadaver, the surgeon alone is able to show the disease in all the stages of its progress. He sees it in its incipiency in one case,— when it has progressed somewhat further in another;— and again in a third he sees it when it has nearly reached a fatal termination. The latter condition, thanks to enlightened medicine and surgery, is daily becoming rarer and rarer, and were operative treatment promptly resorted to, need scarcely exist at all.

Consequently it is the surgeon first and foremost who is privileged to appreciate what grave lesions and pathological processes may exist with few marked symptoms, and even these may be masked until the time when they will show their effect so quickly that no form of treatment will be of avail. He is able to see more clearly than the physician how the complications of gall stones — adhesions, cholecystitis, pancreatitis, etc.,— make difficult the diagnosis and retard the treatment. It is the surgeon again who shows how often gall stones are present and underlie the symptoms when their presence can scarcely be suspected, and he it is who often demonstrates that cases

formerly given up in despair of diagnosis, have as foundations of their illness either gall stones or their common accompaniment, adhesions of the upper abdomen.

Such conditions as these would naturally lead us to restrict the field of medicine and enlarge that of surgery in gall-stone disease; yet surgical treatment is by no means to be insisted upon for all patients. It has been well said by Kocher that gall stones do not "belong" to the surgeon. "They belong," he says, "in the first place to the patient and if he prefers to retain them and to drink Carlsbad waters as well, he is quite within his rights to adopt this method, a line of treatment which, as is well known, is followed even by many surgeons when they themselves have gall stones. In the same way, if a patient prefers to wait in suffering and pain for a stone to work its way down *per vias naturales*, he is but enjoying his personal privileges. But," as Kocher adds, "at the present day the surgeon is certainly justified in telling a patient with gall stones that by an operation he can be quickly and safely cured of his trouble and be saved from eventual danger, more rapidly and more easily than by any other treatment."

There are, in the first place, many cases in which a patient has but one or at most two attacks of gall-stone colic in a lifetime, and in the interval is perfectly well. Medical treatment and hygienic watchfulness meet all demands in this class of cases; but at any moment acute symptoms may arise demanding immediate operation, and then both patient and surgeon will realize, perhaps too late, the greater safety and efficacy of operation in the interval between attacks.

Then again, many patients urgently in need of radical relief show contraindications to surgical intervention. Thus, persons who are markedly anemic or cholemic, who are very old, or who have some grave lesion of the heart, lungs or kidneys, should be operated on only as a last resort, if at all.

Many also in whom surgery is indicated refuse for personal or extraneous reasons to consent to operation. Such cases as these are entitled to medical treatment, though the surgeon should not conceal from them the added risk they run in postponing radical cure.

The medical treatment of gall-stone disease I will not discuss at length. It must aim to reduce inflammation of the gastro-intestinal tract, to favor elimination of toxins, and to guard against dietary and other indiscretions which cause exacerbation of the symptoms. This is the rationale, or rather what is accomplished in selected cases by the Carlsbad treatment, as carried out at these celebrated Springs. It must not be understood that the Carlsbad waters or the Carlsbad treatment dissolves stones or forces them through the bile passages, for such is not the case. Many people who take the journey to Carlsbad are not suitable subjects for this treatment, the consequence is that much of my time is occupied by operating on patients who have received this treatment with no results. The journey to Carlsbad is expensive and can only be entertained by those whose financial conditions permit it; therefore, he

who has to earn his bread by the sweat of his brow must submit to the aseptic scalpel of the surgeon if he would obtain a cure. I have never had any evidence that the medical treatment in these cases is anything but palliative. The cure of gall stones by medication or the relief of their complications by drugs is, for the present at least, an impossibility. Reported cases of cures are generally found to be instances in which the stones have become quiescent, but have not been removed. Dr. A. O. J. Kelley, in studying 216 patients recently operated on by me for infections of the biliary tract, said (Amer. Jour. Med. Sc., Nov., 1906): "We now know that the thousands of gall stones said to have been passed by the bowel after the administration of olive oil are merely masses resembling gall stones in outward appearance, and due to the basely deceptive powers of the olive oil acquired in its passage through the intestinal tract."

There is no doubt that much can be done by medical means to build up the patient, reduce the effects of cholemia and prevent recurrence of attacks of colic, not to mention relief of acute pain. But that gall stones can be broken up, dissolved, removed, or otherwise done away with by drugs, seems to me an idle statement in view of the modern understanding of their nature and pathology. And especially unaffected by medical treatment must always remain the graver complications of gall stones, such as empyema of the gall bladder, adhesions, fistulae, etc. It must not be lost sight of that gall-stone disease can remain latent until Nature places the patient asleep in the everlasting rest of the grave. Granting then, that surgery is the preferable treatment in most cases, there is still the distinction between those in which the operation is one of immediate necessity, and those in which it is one of choice. In the former group we may include primarily cases in which we have marked infection, with cholangitis, or with empyema of the gall bladder, and those cases of obstruction of the common duct which show no tendency towards amelioration of the symptoms after a reasonable time of treatment — which I consider to be from two to three weeks.

In the latter class are cases of simple hydrops of the gall bladder, and ordinary cases of cholelithiasis in which the attacks are separated by longer or shorter periods of good health.

So also are those doubtful cases in which a diagnosis rests between one of gall-stone disease and a duodenal or gastric lesion. A realization of the number of cases in which prolonged indigestion of a more or less marked type, continued flatulence and vague epigastric distress and pain are due to gall stones or their sequels, has only of late years become more common. First and foremost among these sequels we must count adhesions of the upper abdomen as a result of gall stones. These impinge upon the neighboring viscera, the stomach and duodenum especially, and give rise to symptoms none the less annoying because they are vague and varying in character. Indeed, it is often the pericholecystic adhesions that give rise to the symptoms of which the gall-stone patient most bitterly complains. Bland-Sutton (Gall Stones and Bile

Ducts, N. Y., 1907, p. 192) narrates that on two occasions where he has removed calculi from gall bladders he was unable to see the liver on account of adhesions.

The prevalence of "indigestion" and "dyspepsia" in gall-stone patients is shown by the fact that in a series of 182 consecutive cases of my own which I have recently analyzed, they were noted in more than forty per cent of the total number.

When surgical intervention has been decided upon for the relief of one or another of the conditions mentioned, we can undertake it with much better spirit and hope of success than would have been possible fifteen or even ten years ago. In hardly any other branch of abdominal surgery has the recent progress been so rapid and at the same time of so definite and lasting a character as in the technic of operations upon the gall bladder and biliary passages.

Needless to say that the patient should be in the best possible condition when the operation is to be performed. Three days of preparation and stimulation where it is needed will often save as many weeks of anxiety after the operation, and will preserve many lives. The circulation should be in the best possible condition, and the excretory organs doing the best work of which they are capable. Anemia should be combated, and delayed coagulation dealt with as far as it can be by the agents which we have at our disposal. In the latter condition the chloride and lactate of calcium have been recommended. I have used them both, but am still very doubtful whether or not they have any real value.

Before the operation itself begins, and during its progress, the anesthetist fully shares the responsibility of the surgeon. Careful anesthesia is of the utmost importance, especially in operations so prolonged as those in complicated gall-stone cases are apt to be.

When the operation itself is considered, there are a number of points to which the surgeon must direct his attention.

1. The incision. In spite of the dictum of so accomplished a surgeon as Terrier, that Mayo Robson's incision is "not sufficient", it is that which I prefer, if any departure from the simple straight incision is demanded. I have never found fuller exposure than it gives, requisite. The use of a sand pillow or some similar support beneath the spine, so as to increase the dorso-lumbar convexity, as first suggested by Elliot of Boston, is indispensable in most operations on the bile ducts. In very difficult cases the reversed Trendelenburg position may be a further aid in rendering accessible the deeper parts of the common duct or the hepaticus.

2. The field of operation when exposed must be carefully walled off from the abdominal cavity at large, to prevent the distribution of possibly infectious material in the peritoneal cavity. I use for this purpose both gauze pads and marine sponges. The former I introduce first, and the sponges above it. The sponges are of advantage in a twofold way: (*a*) They absorb the bile or fluid

rapidly and hold it well. (*b*) By their elasticity they may be made to act as retractors, especially when held by the hand of an assistant. The operation is much accelerated by introducing packs where they are to remain until the close of the operation. Many surgeons will have to remove their packs several times and again reinsert them, before they are able to obtain sufficient exposure in the depths of the wound. This is usually due to carelessness, and to neglect of the surgical principle of beginning the insertion of the pads from one extremity of the incision. If the first pad be placed in the middle of the incision, the intestines will prolapse on both sides of it, and before a second pad can be placed the first will have become useless.

3. Adhesions must be dealt with and removed when they mask the field of operation, obstruct the biliary passages, or interfere with surrounding organs. They should be left alone when they are doing no damage, as their removal always takes time, and prolongs the operation, and may lead to consequences more grave than those to which their presence gives rise.

4. All the stones present in any one of the bile passages must be removed, unless they are far within the hepatic ducts and cannot be reached. A stone left in the gall bladder becomes a fresh focus of stone formation, while a small fragment in the ampulla or common duct of course invalidates the whole operation.

5. The gall bladder should be left when it is not so much damaged as to be functionally inactive as a bile reservoir, but must be removed when the contrary is the case.

6. After an operation on the gall bladder or bile passages, drainage should always be instituted in the presence of infection, and also in the majority of cases even when no infection is present. This renders the operation much more safe, and lessens the chance of subsequent complication. To me it is incomprehensible that surgeons should regard drainage of the hepatic duct through the common duct into the duodenum as sufficient in cases of infectious cholangitis. To drain one infected organ into another — the duodenum — I consider unsurgical in the extreme. In cases of severe pyelo-nephritis we are not satisfied with the drainage afforded through the ureter, into the bladder, which was probably the original seat of the disease — but we perform nephrotomy, and drain the kidney directly into the loin. So when the liver is infected, and we have a suppurative cholangitis, the only chance of safety lies in direct hepatic drainage through the laparotomy wound. The intra-hepatic pressure must be relieved, and this can not satisfactorily be done by drainage into the intestinal tract.

7. After removal of the gall bladder in the presence of infection there should always be some chance for the drainage of bile, either by draining the stump of the cysticus, or preferably the hepaticus through the common duct, by means of a rubber tube. When there is no such infection, and the gall bladder has been removed, a cigarrette drain should be introduced to the site of the ligature on the duct, to guard against infection should the ligature slip or be thrown off by the *vis a tergo*.

8. There should be as little disturbance of the peritoneum as possible. If there is much trauma to this delicate membrane adhesions are sure to result. This must be borne in mind especially when introducing gauze drains. These, when used in the conditions under discussion, should always be covered with rubber dam or introduced through a split rubber drainage tube to prevent their sticking and forming adhesions.

This is but a brief outline of some of the cardinal principles underlying gall bladder surgery. Only those who do it can appreciate its difficulties and dangers, and no branch of surgery is less suitable for the tyro. The surgeon who does gall-stone operations must be prepared to do a gastro-enterostomy, or an entero-enterostomy,— in fact, must be ready for almost any abdominal operation. Complications are often found to exist which tax the skill of any surgeon, and the avoidance of danger to surrounding organs or spreading infection is no easy matter.

The surgical treatment is by no means ended when the patient leaves the operating table. The after treatment is in most cases simple. The patient is left alone and recovers. Stimulants may at times be needed, and their nature and indication will be evident. The drainage must be left in an adequate time — until it has fulfilled its function and can be removed easily.

Perhaps the most common post-operative condition that calls for prompt treatment is persistent vomiting. Early and often repeated lavage is its only treatment, and practically never fails to give relief.

The results of surgical treatment of gall-stones are universally acknowledged to be highly satisfactory. In no other branch of abdominal surgery is a final and permanent recovery more sure to follow operation. In a series of 182 cases of gall-stones, operated upon by me in the last few years, I have had a general mortality of 14.8 per cent. This includes besides simple cases, — carcinoma, cholangitis, purulent cholecystitis, perforation of the gall bladder and local peritonitis. In selected cases the mortality is of course less. My later cases give a much lower percentage of mortality than the earlier ones, the improvement in the death rate going hand in hand with the improvement in technique and more careful selection of cases.

Much would be gained if the cases came to the surgeon earlier, when gall-stones alone had to be dealt with and not their complications. The complications cause the operative failures and raise the mortality. Sepsis and infection before and at the time of operation have caused nearly half of the deaths in my cases.

It is evident then, that if the cases are sent to the surgeon in due time, and operated upon only when they are in suitable condition, few failures will follow proper surgery.

Medicine and Surgery must go hand in hand in the treatment of gall-stones, each treating a separate class of cases, and always bearing in mind the fact that a surgical cure is the only final and definite one.

DEPARTMENT OF TECHNIQUE

EXCISION OF THE KNEE-JOINT[1]

By ALEXANDER HUGH FERGUSON, M.D., Chicago

The subject of excision of the knee-joint is very extensive. So much has been written regarding it, that to make any attempt to cover the literature would consume more time than is allotted to me this evening. Therefore, instead of going exhaustively into the literature of the subject and giving you information which can be gleaned from text-books, I will describe to you how I prefer to perform an excision of the knee-joint.

As you are well aware, the evolution of this operation has passed through as many stages of commendation and opposition as probably any other operation that has become established. While it was attempted in 1761, it was not deliberately performed until 1781. Nothing further was done for about sixty-nine years, until Sir William Fergusson, in 1850, revived the operation and put it on a surgical basis. Of course, this was in pre-antiseptic days, when, as you know, the mortality was high on account of sepsis alone, to say nothing of the deaths that followed operation on advanced cases or those that had been abandoned as hopeless by all other methods of treatment.

The mortality attending the operation even at the time of Sir William Fergusson was about fifty per cent, and many years elapsed before any other surgeon would follow him. Gradually, however, a few French, German, English, and many of the foremost American surgeons took up the operation of excision of the knee-joint. Not, however, until the time of Lister, when the dangers from sepsis could practically be excluded, did the operation become the operation of choice in cases of chronic tuberculous disease.

Twenty years ago the operation was probably practiced most, and more excisions of this joint were performed then in our large hospitals in the space of a month than are performed to-day in a year or more. The advance and improvement in orthopedic treatment, mechanical appliances, the favorable changes in surgical technic, the partial resections and intra-articular medication, have all contributed wonderfully to reduce the number of excisions of the knee-joint. Then, too, excision passed through that stage when it was tried for everything else as well as for struma of the knee-joint. The time was when a slight injury of this joint was considered almost as fatal as a puncture of the peritoneal cavity. I remember in my early student days of seeing several patients die from a slight injury to the knee-joint. So fearful were surgeons of performing this operation in the early days, that excision was only practiced by the most fearless surgeons. But Langenbeck, Hoffmann, Fergusson, MacKenzie, Kohn, Macewen, Ollier, Fenwick (of Montreal), Kocher, and a number of other surgeons have taken part in establishing the operation of excision of the knee-joint as we perform it now.

The operation is no longer primarily considered in connection with ordinary gunshot wounds. It is no longer thought of during the primary invasion of tuberculosis, where only a limited amount of the structures of the joint are involved by that disease. The early excision for tuberculosis never reached the same prominence that excision of the hip-joint did. Eighteen or twenty years ago the former was popularized by Macewen more than by any other surgeon. To-day we may say that traumatism, early inflammatory changes (tuberculous or otherwise), conditions of flail joint, and those nervous conditions arising in children which affect the knee-joint, are no longer treated by excision. That limits the indications for excision of the knee-joint practically to the adult, and principally to the tuberculous conditions. I mean that form of excision which has for its object permanent bony ankylosis. Recently, however, some surgeons, myself among them, have in a few cases attacked firm, fibrous, or bony ankylosis of the knee-joint with the view of getting motion by shortening the limb somewhat and by placing some mature fibrous structure between the ends of the bones forming the joint. This operation is known in surgery as arthroplasty.

In performing excision we have two objects in view: one, the object of producing bony ankylosis, and the other of securing a certain amount of motion.

There is one thing which should be remembered

[1] Read before the Chicago Medical Society, June, 1907.

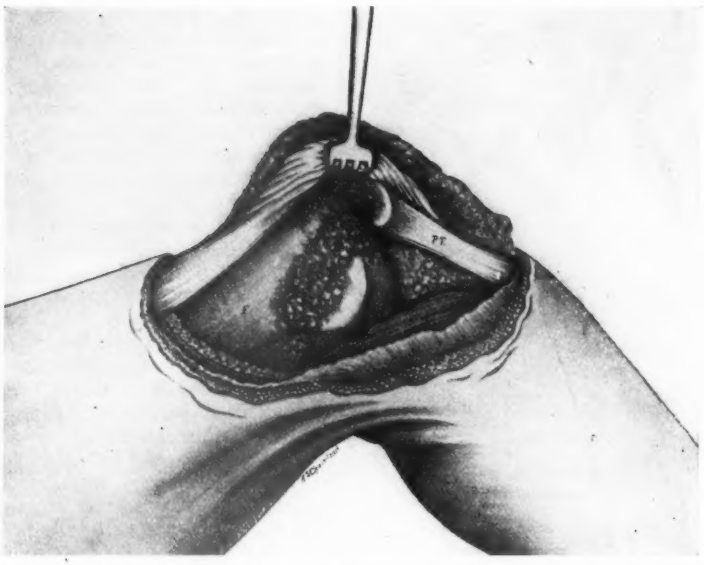

Fig. 1. External semilunar incision. P. Patella. P. T. Patellar tendon. F. Femur.

and that is, that no joint should be excised that is the seat of a mixed infection. If an adult has a stiff joint, one that is a hindrance to him in his locomotion, the limb may be shortened an inch or an inch and a half. Then the patient will be able to swing the limb when he raises himself on the opposite foot without encountering objects on the ground. A short limb, one that is stiff, is more useful than a long one that is stiff. Nature provides for this in children. The development of the limb that is tuberculous does not take place in the same proportion and extent as it does in the sound limb.

With this short introduction to the subject, I will describe briefly the method which I prefer in dealing with the knee-joint.

First of all, I prefer to employ an external lateral or longitudinal curvilinear incision, beginning a little below the tip of the tibial tubercle, extending downward and backward, curving forward and upward to the center of the thigh to a point opposite the limitations of the suprapatellar synovial pouch, under the quadriceps extensor. The knife with which the incision is made through the skin is discarded. It has done its work. It is probably smeared with germs from the sebaceous glands and hair follicles in the skin. Another knife is now taken, and with it I cut through the other structures in the same line until the synovial membrane is reached, cutting to the synovial membrane but not through it. This wound is then rendered antiseptic by the application of carbolic acid or Harrington's solution so as to prevent the implantation of tubercle bacilli on the raw surface when it is opened up. Then the joint is opened boldly in the same line. The next procedure is to take a sharp hook and place it at the outer edge of the patella and turn the flap forcibly to the inside of the leg. One may meet with some resistance on the part of the patellar tendon, or from the sheath of the quadriceps extensor muscle, but nicking these structures is sufficient. Having done that, I forcibly flex the knee-joint, the leg on the thigh, so as fully to expose the entire inside of the joint for inspection and manipulation.

The next step in the technic is to guard against the spreading of infection that is inside the joint to new raw surfaces which we make when removing the diseased structures. In order to avoid this, we can take some gauze, soaked in an antiseptic solution, and disinfect the surface of the diseased structure inside of the joint before commencing to dissect out the diseased synovial membrane. I begin to remove the diseased synovial membrane from its upper limitations by careful and clean dissection, and as soon as I strike a new focus, I at once disinfect it. At one time I employed irrigation during all this work. Now, I disinfect

Fig. 2. External semilunar incision. C.L. Crucial ligament. P. Patella. P.T. Patellar tendon. S.C. Semilunar. Q.T. Quadriceps tendon. T. Tibia cartilage.

at once, take another knife, and start behind the focus until I find I am getting into a normal plane outside of the diseased structures, and sweep everything down until I come to the attachment of the synovial membrane to the cartilaginous structure at the upper portion of the knee-joint, extending that to the sides as well. Then, I begin below and liberate the head of the tibia to a line where I want to saw the bone, without interfering with the intra-articular structures. To interfere with these would be to soil one's hands, to soil the instruments, and get into septic territory.

The next step in the operation is to saw through the bones. I prefer to saw through the head of the femur in a curved line (Fenwick), retaining, eventually, the normal contour of the head of the femur. The bone being sawed in this manner, I then aim at sawing the head of the tibia in the opposite direction, curving the cut out so as to have the concavity upward. It is not easy to do that with a Butcher saw or any other kind of saw. Take a saw and cut the end of the tibia square through first, and then curve out the head of the bone with a Butcher saw. The cartilages and the soft structures within the joint are now in two flaps, one from the head of the tibia, the other from the head of the femur. These are raised together and dissected away, taking care not to cut through the posterior ligament of the knee-joint.

This being done, there may be some little fitting to do, but after removing the two flaps, including the greater portion of the diseased tissue or all of it, we must look in two directions for diverticula. The diseased synovial membrane in a large percentage of cases dips behind the tibia, sometimes to the extent of an inch or two, and another pouch extends toward the head of the fibula. These must be dissected out. If, now, after taking off the head of the femur, there is extension of the disease into one or both condyles, use a Volkmann spoon, and remove all the diseased bone. Then the question arises whether it is better to resect the bone higher up or to drain the cavity or cavities made with the Volkmann spoon. This should be left to the judgment of the surgeon, who must be influenced in his decision by the age of the patient. If we have to perform an operation on a patient who is growing, which we do not do very often, the removal, say, of the head of the femur or tibia beyond the epiphyseal line should not be considered for a moment. Consequently all the cavities that have been gouged out of the bones must be drained. In adults, however, it is often more practicable to cut squarely through the head of the femur and tibia. The method devised by Fenwick of sawing and fitting the bones together prevents one result which so frequently takes place, namely, a forward sliding of the head of the femur over the head of the tibia. I am very fond of using nails, even when I have sawed the ends of the bones in a concavo-convex manner, for then I feel certain that the bones will stay in place.

Drainage after excision of the knee is, in my opinion, imperative. Drainage with silkworm gut is sufficient in the vast majority of cases. Several strands of the silkworm gut are passed immediately underneath the bone. I not infrequently pass a smaller drain upward to the large quadriceps extensor muscle. Then, before closing the incision completely, I inject an ounce of iodoform emulsion into the joint and apply a dressing. I prefer to rest the limb for the first few days in the half-box splint devised by Macewen. It keeps the limb and foot in the proper position; it extends up to the axilla, and the half-portion of the box goes underneath and supports the entire lower extremity and fixes all the joint. A point brought out by Langenbeck, Volkmann, and a number of other surgeons is that it is better to raise the popliteal space a little, so as to have the limb in the position of slight flexion rather than perfectly straight, on account of the tendency of the limb eventually to become bent backward at the knee-joint. Plaster-of-paris may be afterward applied. However, it does not make much difference what permanent

application is used, provided union has taken place. The foot should not be allowed to flop down sideways, for the reason that it remains there a considerable length of time, and it takes several months for the patient to overcome the eversion of the entire limb. If this eversion can be prevented or overcome, the patient can walk like the ordinary man. The reason for that is that the structures around the knee-joint become accustomed to a passive condition for several weeks, and therefore the activity to counteract that does not return for a considerable number of weeks.

Wiring of the ends of the bones should not be countenanced, nor should the sewing together of the ends of the bones with catgut be practiced, because it leaves foreign material there. Chromicized gut or other suture material may act as a nidus for the multiplication of germs.

Dealing with the patella is important. I prefer to shave off all the articular surface, leaving a certain amount of its external portion intact with the quadriceps extensor muscle. I am sure it is much stronger than when we remove the patella completely.

The after-treatment is of importance. Where we get primary union, or union by secondary intention, as the case may be, the patient should be under the guidance and direction of the surgeon for the next six months or so. I have seen several knee-joints run riot, so to speak, because no attention was paid to them afterward. In one case, even three months after excision of a tuberculous knee-joint, the bone has not fully recovered from the disease, there being a certain amount of osteoporosis. With the weight of the body coming on one place more than another, in a little while there will surely be more or less giving-way. To counteract this difficulty, however, I have made it a rule for these patients to wear a knee-splint for at least six months after excision.

CHOLECYSTOTOMY AND CHOLECYSTECTOMY AS PRACTISED IN THE CLINIC OF MR. MOYNIHAN

By HAROLD COLLINSON, M. S., F. R. C. S.

CHOLECYSTOTOMY

The preliminary treatment of patients to be operated upon for gall-stone disease is identical with that in all abdominal operations.

Preparation of the Surgeon. The cleansing of the surgeon's hands, and those of his assistant, is performed as follows: After a preliminary "social" scrubbing with nail brush and soap beneath a stream of hot water the hands and arms are methodically cleansed with sterile swabs and a nail cleaner in a bath of hot sterile water, this scrubbing is continued for at least five minutes and then the hands are rubbed over with a solution (1 in 500) of sublamin in methylated spirit (70 per cent), and the latter allowed to dry upon the hands. A second and a third bath of sterile water are used and the same routine carried out, sublamin spirit being applied after each scrubbing. A full twenty minutes is thus spent in sterilization of the hands.

The assistant next puts on a pair of sterile rubber gloves and gives the patient's abdomen a final cleansing with ethereal soap, and finishes by swabbing the whole operation area with "sublamin spirit." His gloves are removed, the hands again cleansed with spirit, and a clean pair of gloves put on and the arms covered by sterilized sleeves which pass beneath the cuff of the gloves. Sterilized caps and mask are worn by surgeon and assistants.

Position of Patient. An inflatable rubber cushion is placed beneath the patient's back at or a little above the level of the liver, and as soon as anæsthesia is progressing the cushion is inflated by a foot pump. This manœuvre makes the liver present in the wound and enables more easy access to the ducts to be obtained. In addition a slight tilting of the table, so that the pelvis is slightly lower than the thorax, will often be found of service.

Technique of Operation. Over the site of the incision in the skin a number of light transverse scratches are first made with a needle. The scratches mark the position for the insertion of the deep silkworm-gut sutures in closure of the wound, to be described later, and ensure accurate apposition of its edges.

An incision from 4 to 5 inches in length is made over the right rectus, near its outer margin; its upper extremity begins at the costal margin, and the incision extends vertically downwards.

The external sheath of the muscle is divided in the whole length of the incision and the muscular fibres separated with the finger, the muscular

branches of the intercostal nerves being preserved intact as a rule.

Bleeding points are seized with pressure forceps, those in the muscular tissue being immediately ligatured or underrun by a suture, in order to avoid laceration of the muscle by chance traction on the forceps. The surrounding skin and edges of the wound are now protected by a "handkerchief" of "tetra" placed upon each side, and held in position by special forceps which fix its margin to the sheath of the rectus and the extremities of the wound. These prevent contact of hands or viscera with the patient's skin and soiling of the margins of the wound by any chance leakage of bile. A good deal of bacteriological work has been done by us, on the lines suggested by Döderlein's observations, which shews that most of the infections in wounds come from the patient's skin. In no operation do we allow the skin to be seen after the incision has been made. The "tetra" cloths and our special forceps for the ends and sides of the wound are a very great help.

In most cases exploration of the ducts is facilitated by extension of the wound upwards and inwards, parallel to, and half an inch from the costal margin, the fibres of the rectus being divided in the line of the incision; for the majority of gall-bladder operations in thin patients this extension is however not necessary.

The posterior sheath of the rectus is now picked up between two pairs of forceps and incised, the peritoneum opened and a finger inserted, the opening then enlarged by scissors to within a short distance of either end of the wound, and a preliminary exploration of the parts made.

The next step is the isolation of the operation area by means of large flat gauze swabs accurately placed. The exact placing of these swabs is important.

The first is packed down to the upper part of the right kidney pouch, it is large and should lie between the duodenum and common duct on the inner side and the abdominal wall on the outer, a second slightly smaller swab is passed towards the middle line, lying over and protecting the stomach to the inner side of the gall-bladder and common duct. A third large swab is placed below, packing the small intestines and colon out of the way, and protecting them; occasionally more than one swab is necessary in this situation. All the swabs have a tape which passes out of the wound and is kept stationary by a clip attached to its extremity; before insertion each is wrung out in hot sterile salt solution.

The operation area is thus entirely isolated from the rest of the abdomen, and the further steps of the operation can be proceeded with.

The gall-bladder and ducts are next carefully freed from any adhesions, these may be thin and delicate or firm and tough, in the former case gentle stripping with the finger wrapped round with gauze will suffice, in the latter case they must be ligatured and divided. The greatest possible delicacy and care is exercised in order to avoid risk of laceration of adherent viscera. When all the ducts are laid bare, the gall-bladder and the liver round it is seized by the left hand and gently dragged downwards, this exposes the ducts more fully and allows of thorough palpation of them, the presence of calculi in the gall-bladder or the ducts is made clear and an accurate idea of the extent of the operation required is formed.

If calculi are present in the gall-bladder the technique of their removal is as follows: A large square, consisting of four layers of gauze, between which a sheet of rubber tissue has been sewn, is taken, and through a small hole in its centre a pair of catch forceps is passed, these seize the fundus and pull it through until a cone of gall-bladder presents. The swab is then arranged so as to cover and protect the rest of the operation area. If the gall-bladder be tightly distended with bile, a larger aperture must be made in the swab and considerable care exercised in traction with the forceps. An aspirating needle (Ochsner's or Douglas Powell's pattern), with a rubber tube passing over the side of the table, is pushed into the gall-bladder which is held by forceps, applied about ¾ of an inch apart. After withdrawal, the needle is placed on one side and not touched again, and the puncture is enlarged with scissors and any escaping bile rapidly mopped up by the assistant with moist gauze swabs, held in long handled forceps. Each mop is thrown away immediately it has been used, and great care taken to avoid soiling of the fingers with bile which should always be regarded as a septic fluid. The grip of the forceps is next changed so that the edges of the incision are seized, and by their means the wound may be held open, or closed when they are crossed.

Through the opening a gall-stone scoop is passed, and the calculi removed; if there are many stones, several introductions of the scoop are needed until the gall-bladder is completely cleared. When all the stones which can be felt with the scoop have been removed, the clips are crossed so as to close the opening, and whilst the left hand steadies the fundus by this means the right is passed beneath the protecting rubber and gauze sheet, and the neck of the gall-bladder and cystic duct carefully palpated; if other calculi can be felt in this situation, an attempt is made to dislodge them by gently milking them

back into the gall-bladder between the index and middle fingers.

If this is possible they are removed with the scoop, and in other cases dislodgement is effected by the scoop working in concert with the fingers externally.

The common duct is finally explored, and if no calculi are found to be present, drainage of the gall-bladder is provided for in the following manner: a rubber tube of one third of an inch in diameter and with thick walls is inserted into the incision so that 2 to 3 inches are laid within the gall-bladder, it is now fixed by a single catgut stitch, which passes through all the coats of the gall-bladder with the exception of the mucosa, close to the margin of the incision, and through the tube, this is tied and fixes the tube firmly. This suture is left long. The remainder of the incision and this stitch are now buried by a continuous catgut suture from side to side, taking all the coats with the exception of the mucosa. This suture embraces the tube closely and invaginates the exposed mucous membrane, so that no leakage can occur. After the fundus has been cleansed with moist gauze mops the rubber and gauze sheet is removed by slipping it over the drainage tube, all instruments which have been exposed to the risks of soiling are laid on one side, and the hands are carefully rinsed, or if soiling has occurred, a fresh pair of gloves is put on.

The swabs within the abdomen are now removed and the right margin of the omentum arranged so as to cover the intestines and surround as much as possible the gall-bladder and tube.

The abdomen is closed in the following manner. After deflation of the rubber cushion beneath the patient a continuous catgut suture is commenced at the lower angle of the wound, including the peritoneum and the posterior sheath of the rectus, this is continued slightly beyond the middle of the wound. The suture is then temporarily laid aside and a similar procedure adopted for the upper portion of the wound, commencing above and terminating below at the gall-bladder.

Silkworm-gut sutures, about 1 inch apart, inserted along the scratches previously made, are next passed through skin, anterior sheath and muscular tissue of the rectus on either side, and left untied for the present. When all these have been placed the catgut sutures, which were temporarily laid aside, are now continued through the anterior sheath of the rectus to their starting place below and above and tied off. The sheath of the muscle is overlapped by the suture which is an interlocking one.

The skin edges are next brought into apposition by Michel's metal sutures, and finally the silkworm-gut stitches are tied loosely and without tension.

The wound is dressed with a simple pad of sterile gauze, kept in position by a solution of formalin mm20 in 1 oz. of sterile gelatine. Outside this a light covering of wool and a many-tailed bandage is applied; the drainage tube brought through and its extremity placed in a U-shaped glass tube, which is suspended to the side of the bandage by safety pins. In this manner the dressings are kept entirely dry, movements of the patient do not displace the tube from the vessel for the reception of the bile, and an accurate measurement of the amount of drainage is obtained.

The metal sutures are removed at the end of 48 hours, and the silkworm-gut stitches in ten days or a fortnight. The tube usually comes away in about a week.

In cases where after examination of the gall-bladder and ducts, and cholecystectomy is decided upon, the operation is performed as follows:

CHOLECYSTECTOMY

The liver being rotated, the cystic duct and its junction with the common duct are defined, at a short distance from its termination a circular incision is made around the cystic duct and a peritoneal cuff reflected towards the common duct. Two pairs of long forceps with a curved beak are now applied to the cystic duct, which is divided between them, the stump is ligatured with catgut and the forceps upon this end removed. By gentle gauze stripping, the cystic artery is next defined, divided between forceps, the proximal end ligatured and the clip removed.

If it be decided not to drain the ducts, the stump of the cystic duct is buried by suturing the reflected cuff over it by two or three sutures of Pagenstecher's thread; before this is done the gall-bladder is separated from its fossa for a short distance by insinuating the finger gently between its pelvis and the under surface of the liver. This separation is at first only carried sufficiently far to allow of access to the stump of the duct, for the suturing is much facilitated by the traction which can be made upon the liver by the partially separated gall-bladder. The stump is touched with the cautery and then buried in the manner described.

The further separation of the gall-bladder can now be proceeded with; by careful dissection with the gauze-covered finger, the gall-bladder is raised from its bed with comparative ease, and is left attached only by the peritoneal fold around it, this is divided with scissors about half an inch from the liver and the gall-bladder is free. A raw surface surrounded by a peritoneal collar is now left, some

slight bleeding may occur from this or from the cut edges of the peritoneum, but sponge pressure is usually sufficient to arrest it; if this is not so, bleeding points on the raw surface may be underrun by a fine catgut suture, or, if upon the peritoneal edge, included in a ligature.

The peritoneum around the raw surface is now closed over by a continuous catgut suture commencing at the cystic duct and terminating at the margin of the liver. The operation area is finally cleansed and the abdomen closed.

If drainage of the ducts be necessary, the stump of the cystic duct is not ligatured, but its edges are seized with small French vulsella and an incision made into it at its junction with the hepatic ducts of sufficient size to admit a rubber drainage tube, this is fixed by a catgut suture which passes through it and picks up the wall of the duct with the exception of the mucosa at a little distance from the cut edge, the rest of the opening is closed snugly around the tube by catgut sutures passing from side to side of the incision and taking the peritoneal and muscular coats only.

In certain other cases it may not be thought necessary actually to drain the ducts, but some doubt may be felt as to the security with which the stump of the cystic duct has been covered in, or it may have been impossible to sequestrate it by a peritoneal cuff. In such a case, after ligature with catgut and removal of the gall-bladder, a rubber drainage tube is passed down to the stump of the duct and retained in position by a catgut suture passed through it and catching up the tissues by the side of the ligated extremity. When the catgut ligature around the duct softens, as it will do in four or five days, bile may flow through the tube for a short time, in other cases no discharge of bile occurs, and on separation of the suture holding the tube (about a week) the wound rapidly closes.

ANOTHER METHOD FOR FORMING A GASTRIC FISTULA

By ROBERT T. MORRIS, M. D., New York

It is not customary to report unsuccessful operations, but the one here described looked so well and so long a time may pass without opportunity for repeating it myself, that it may be well to publish a note of the case. Charles M., 71 years of age, drank hydrochloric acid by accident. The esophagus became nearly or completely occluded during the following three weeks. Rectal alimentation. Thirty pounds loss of weight. Patient extremely feeble when I first saw him on November 25, 1907. Operation at St. Mark's Hospital on the following day. Incision parallel with the left costal border, in the expectation of performing Witzel's operation. Stomach so much contracted that this operation was impossible of performance. A ribbon of skin about an inch wide dissected away from either side of the original incision. Ribbons about four inches long remained attached at their cephalad ends. Free ends of ribbons drawn into an opening in the stomach near attachment of gastro-colic omentum and sutured to mucosa in such a way as to leave a round tube of skin. Margins of ribbons sutured in such a way as to complete the tube. Gastro-colic omentum easily wrapped about the tube and sutured to the abdominal wall, to guard against leakage and to help furnish lymph circulation for the tube of skin. Rubber tube left within the skin tube,— with one end in the stomach and the other end free outside. Wound closed. Operation performed rapidly, and looked to be very satisfactory from a mechanical point of view. Patient too feeble to rally. Died on the following day. When occasion presents for repeating the operation, I shall dissect up a strip of skin four or five inches long and two inches broad, for making the skin tube, instead of having it consist of two ribbons of skin. So far as I can judge, this skin tube can be carried to the stomach easily, no matter how much it may be contracted and retracted, and the operation appears to be more simple than the classical ones. The skin tube lies obliquely to the plane of the abdominal wall and would apparently remain closed against leakage of stomach contents, and at the same time would allow of passage of the feeding tube.

EDITORIALS

SURGERY, GYNECOLOGY AND OBSTETRICS

SURGICAL PUBLISHING CO. OF CHICAGO
103 STATE STREET - - - - - CHICAGO

SUBSCRIPTION PRICE, FIVE DOLLARS PER ANNUM IN ADVANCE

Managing Editor - FRANKLIN H. MARTIN, M. D.
Associate Editor - ALLEN B. KANAVEL, M. D.

JANUARY, 1908

EDITION FOR THE BRITISH EMPIRE

With this the first issue of the sixth volume of SURGERY, GYNECOLOGY AND OBSTETRICS, the editorial management takes pleasure in announcing the beginning of the publication of an EDITION FOR THE BRITISH EMPIRE. The American and British editions will contain the same scientific material and will differ only in the external makeup and in the relative positions of their editorial staffs.

The unusual interest manifested by the English practitioners since this publication made its appearance in America, as shown by their contributions and their subscriptions, determined the Editors to open negotiations with the men in Great Britain, with the idea of bringing the publication nearer to them by establishing a London office, and of further unifying the surgery of the two great English-speaking nations, by appointing a few of their representative surgeons to organize an editorial staff corresponding to the editorial staff of the original American edition, said staff to co-operate directly with the editorial management in obtaining for the publication a greater proportion of the representative surgical contributions of Great Britain.

In this undertaking we have been met with great cordiality, and the eminence of the men who have consented to serve upon our editorial staff argues well for the success of our edition for the British Empire.

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In establishing a closer friendly relation with the surgical practitioners of the British Empire, we are only following our original conception for the attainment of the greatest efficiency in the editorial conduct of a surgical magazine, viz.: that the editorial direction should be under the guidance of men actually engaged in the practice of surgery, gynecology or obstetrics, as they, only, are in close touch with the new, and can judiciously discriminate between the practical and the visionary. We shall depend upon this collaborating staff to keep us in communication with conscientious experimental or technical surgical accomplishments in all divisions of the United Kingdom.

It is the ambition of the management to duplicate the success of their American edition by a like success in Great Britain and the Colonies. We believe this is not impossible; and the accomplishing of such a feat will go far toward attaining the ideals of the organ-

izers; viz., to make SURGERY, GYNECOLOGY AND OBSTETRICS one of the strongest international surgical magazines published. To this end, we promise that no proper efforts nor expense will be spared in developing the edition of the British Empire to the highest degree of excellence. FRANKLIN H. MARTIN.

CHOLECYSTOSTOMY FOR MYOCARDITIS

Of the three groups of heart disease, valvular disease, disease of the coronary arteries, and myocarditis, the last named is of growing surgical importance. Disease of the coronary arteries and defects in the valves of the heart concern the surgeon when he undertakes operations which require prolonged anesthesia or entail great shock.

The secondary diseases, of which nephritis and myocarditis may be mentioned as illustrations, are generally due to some form of toxæmia. These conditions, through our ignorance of their source, are often called cryptogenetic toxæmias. Indubitable evidences of toxæmia are found in the blood, in the excretions, and in co-incident symptoms. A part of the toxæmias are considered to be of endogenous origin, and their source is traced to primary changes in one or more of the ductless glands; in Graves' Disease, for example, to the thyroid and throidectomy leads to the most perfect cure, and in the severe toxæmias of infancy to perverse assimilation, and complete recovery follows starvation or change of diet.

In spite of the great preponderance of endogenetic toxæmias, there are still some examples of the exogenetic disease, which appeal to us most strongly as curable. Thus, the anæmia of the miners disappear when the anchylostoma duodenalis is driven off with thymol, and diphtheria vanishes with the use of antitoxine. Chronic infections of the mucous cavities of the body are prolific sources of toxæmia, and chief among them stands the infection of the gall-bladder in the production of a toxæmia which manifests itself in the symptoms of myocarditis. Not every case of chronic cholicystitis is attended by myocarditis, any more than every case of myocarditis is due to this infection, but it is one of the most interesting manifestations of the disease, and in a considerable number of cases of cholicystitis it has proved to be, by all odds, its most conspicuous and troublesome result. Why this is the case, more careful studies than our clinical observations alone may yet make clear. This phenomena is analogous to the selection of injested poisons. The toxæmia of lead poisoning shows itself in wrist drop, while that due to methel alcohol strikes the optic nerve, and other poisons show great and inexplicable diversity in the production of symptoms and lesions.

* * *

It is common experience that many patients who suffer of tachycardia, dilated heart, myocarditis, give a history of long past "bilious attacks," or symptoms of present cholicystitis. This condition presents itself in the middle-aged and the old; in the robust and the flabby; in the alert and in the sedentary; in the overfed and in the abstemious; in men and in women.

Such patients present the history of gradually increasing dyspnœa; sometimes, after unusual strain, or angina-like attacks, and at last such severe symptoms as to require the serious attention of the physician. The pulse is now found rapid, 90-120; the temperature varying between 97-101, and the respiration slightly accelerated. There is, moreover, an open mouth, a sighing inspiration, and often an occasional cough. The complexion and conjunctivæ are dusky, if not yellowish, and the skin cold, moist, and soft. The patient has usually lost noticeably in weight, 20-60 pounds. The blood pressure is not high, perhaps 140-

150, corresponding, generally, with the age of the patient; the hemaglobin index, 70-90; and the leucocytes 10,000-18,000. If the examination is continued over a considerable period the urine will show an occasional shower of casts and a little albumen. The abnormal excretory elements, indican, aceton and purin bodies will occasionally show themselves. The area of cardiac dullness will be increased from two to five inches and the apex beat correspondingly displaced. Often there is valvular incompetency which increases with the dilatation. The liver is generally, though not always, enlarged in a downwardly direction. The spleen is not recognizably increased in size. The gall-bladder is tender, especially after the angina-like attacks and sometimes forms a prominent tumor in the abdomen. Otherwise the patient presents no evidence of disease. The history varies somewhat in the onset of the angina-like attacks, in the rapidity or severity of the symptoms and in the appearance in other parts of the body of co-incident symptoms of toxæmia. The functions of the stomach are most often disturbed. There is nausea or regurgitation or vomiting of food. The vomiting is sometimes so frequent and severe as to be a factor in the production of heart strain and marasmus.

* * *

Through the suggestion and support of a colleague, the writer has been able to demonstrate clinically the verity of this theory, and restore to health a number of cases giving symptoms of myocarditis. The patients have submitted to his critical examination, and been put under favorable surroundings and careful medical treatment, for weeks or even months, without showing substantial improvement. On his recommendation the gall-bladder has then been opened, usually under Schliech's local anesthesia, or, in a few cases, with ether narcosis, and the diseased gall-bladder drained. The results have been most marvelously gratifying to the patients and almost incredible to the observer. Immediate improvement has followed in every case. The pulse rate has fallen rapidly, the heart and liver have returned to almost their normal size and function, and the comfort, appetite, and nutrition of the patient have rapidly increased. In one case, which had been diagnosed carcinoma of the liver on account of the irregular tumor in the region of the gall-bladder and the great size of the liver, the recovery was almost miraculous; but the fistula closed soon after the patient went to his business, and his symptoms returned. They disappeared, however, when drainage was re-established. One patient, a man of forty-six, who had been invalidized for nearly a year, has been able to resume his occupation as locomotive engineer and continue it up to the present time, a period of four months, without relapse.

In every case the condition of the gall-bladder has evidenced in one way or another the location and chronicity of disease, sometimes by the enormous thickness of its walls, sometimes by the presence of black bile or stones, and sometimes by two or more of these conditions. That the cholicystitis was the real and only source of the myocarditis seems clinically demonstrated by the indubitable and uniform improvement of the condition of the heart after the cholycystostomy. The average duration of the drainage has been eight weeks, though in some of the cases it has lasted three months. Fortunately, an autopsy has been obtained on one of the patients who had severe angina-like attacks, and upon whom the sentence of sclerosis of the coronary arteries had been repeatedly pronounced. He was sixty-two years old, and yet made such substantial improvement after the cholycystostomy that he was able to attend to his business with only slight restrictions to his habitual activities. He died after

a general anesthetic, for an operation connected with an accident to his inguinal hernia. The coronary arteries were found at the autopsy to be soft and young, and capable of nourishing the heart muscles.

All of these patients have given indisputable symptoms of toxæmia in the morphological elements of the blood and in the abnormal chemical constituents of the urine, as well as in the general complexus of symptoms. The examination of the contents of the gall-bladder has not disclosed the character or source of the alleged toxines, and no infectious organism has been isolated which can be put forth as the cause of the primary disease of the gall-bladder, the resulting toxæmia, and the secondary myocarditis from the symptoms of which the patients sought relief.

BAYARD HOLMES, M. D.

THE SURGICAL TREATMENT AND PREVENTION OF PANCREATIC DIABETES.

The studies of the past few years direct attention more and more to the pancreas as the organ most concerned in the production of diabetes. Greater care in the investigation of the morbid histology of the pancreas in diabetes reveals a constantly increasing proportion of cases in which some organic defect exists. We are not yet prepared, however, to grant that all cases of diabetes are of pancreatic origin, or that all the microscopical variations from the normal which have been found in the pancreas possess etiological significance. There certainly is more than one type of diabetes. Pathologically as well as clinically, the variations are too pronounced to permit of a common grouping. There is abundant evidence to prove that carbohydrate metabolism is an exceedingly complex process, dependi[illegible]on the normal integrity and co-operati[illegible] of more than one organ. The occurrence of diabetes without demonstrable lesions of the pancreas is consequently not surprising, and does not disprove the pancreatic nature of other instances in which that organ is found diseased. The changes may undoubtedly be coincident or accidental, but independent of the diabetes, and it has long been recognized that the cellular alterations in the pancreas in certain types of the disease are not so distinctive as to be significant in view of the widespread sclerosis of the tissues and organs generally. Diabetes may be the cause instead of the result of changes in the pancreas. On the other hand, diseases of the pancreas are not infrequent without glycosuria. Enough healthy gland tissue may remain in such instances to preserve carbohydrate equilibrium. Less easy to reconcile with the pancreatic theory of diabetes are the observed cases in which complete disintegration of the gland has occurred from cancer, hæmorrhage, suppuration, and necrosis, without the appearance of sugar in the urine. Emphasis must, however, not be placed too strongly on the negative evidence except to point the fact that it is not yet proved that diabetes is always a pancreatic disease. The fact remains after all is said per contra that lesions of this organ constitute the one definite pathological basis in diabetes which research has furnished us. The gland changes noted include acute pancreatitis, calculi, cysts, malignant neoplasms, fatty degeneration, and most frequently chronic pancreatitis. Acute pancreatitis is not a common disease, and is rarely productive of glycosuria, owing to its extreme fatality and fulminant course. We are inclined to agree with Robson and Cammidge (The Pancreas: Its Surgery and Pathology. W. B. Saunders Co., 1907), that the occurrence of glycosuria during the course of carcinoma of the pancreas, cysts, or calculi is probably not a direct effect of these morbid factors, but

rather a result of chronic inflammatory changes of the parenchyma which arise secondarily.

Chronic pancreatitis remains the most frequent lesion associated with the production of glycosuria. The relation which the pancreas bears to the intestines and other hollow abdominal viscera exposes it to invasion by bacteria through its ducts, while infection may be brought to it by the blood current. Low grade infective process may originate in such manner and by gradual destruction of the gland structure eventually so greatly interfere with its glycolytic function as to produce glycosuria as a secondary effect. Both experimental and clinical evidence have shown that glycosuria occurs only when the greater part — equal to three-fourths of the gland experimentally — has been removed or destroyed by disease. The appearance of sugar in the urine, therefore, points to an advanced generalized lesion. Our clinical knowledge of chronic pancreatitis has been for the most part learned during gall-bladder explorations for stone. The association of chronic pancreatitis with gall-stones is a frequent one.

Quenu and Duval (*Revue de Chirurgie*, October, 1905) report 118 cases associated with gall-stones. The association of certain types of glycosuria with infections of the gall-ducts and gall-stones has been known for some years. The explanation of the connection between these two conditions must assuredly be sought in the condition of the pancreas. Robson and Cammidge report 65 consecutive cases where calculi were found in the common duct at operation, and the pancreas was enlarged, sugar being present in the urine of 4 cases. In 3 the glycosuria was minimal (0.2 per cent.), and disappeared after operation. The fourth case (sugar 0.4 per cent.) subsequently developed true diabetes. Of the last 30 cases of glycosuria seen by the writer, 3 presented unequivocal signs of gall-stone disease. Difficulties arise in attempting to interpret the association. They may be of coincident occurrence, the outcome of an infection common to both gall-tract and pancreas, or the pancreatitis may arise secondarily to the gall-bladder disease by extension via the pancreatic duct. It is but natural, especially in view of the present tendency to substitute surgical for medical therapy when the latter is merely palliative and less than satisfactory, that the suggestion should be made that cases of glycosuria, due to chronic pancreatic infections associated with cholelithiasis, might be successfully treated by drainage of the gall-bladder. Admitting that under certain favoring conditions the venture might prove a tempting one, and be carried through with success, so far as the cholelithiasis is concerned, it is difficult to see what good toward the diabetes could be accomplished, except perhaps by removing one source of irritation and toxæmia to improve the patient's general condition, and, secondarily, exert some restraining influence over the progress of the diabetes. The advent of diabetes in cases of chronic pancreatitis indicates widespread and advanced disease of that organ. The cure of an established glycosuria by gall-bladder drainage would indicate that at least a partial anatomical restitution of the diseased gland tissue had been brought about by the operation, a result which, to say the least, cannot be reasonably expected.

Robson and Cammidge have undoubtedly secured in three cases a disappearance of glycosuria following the removal of common duct-stones. It is to be remembered, however, that these were not cases of true diabetes, but of an extremely mild grade of glycosuria, probably dependent on a pancreatic process, which was not sufficiently advanced or chronic to prevent restitution above the requisite functional limit. Their fourth case of more severe and inveterate type was uninfluenced by the opera-

tion. It is the experience of the writer and the views of Robson and Cammidge are concurrent (ibid., page 278), that glycosuria associated with gall-stone disease is, as a rule, of extreme chronicity and mildness, resembling in progress the cirrhoses generally. Diet and hygiene suffice in such cases to maintain a good compromise toward the diabetes.

The great advantage which accrues from a clearer insight into the pathology of disease is that it enables us to progress in the direction of preventive therapy. Knowing the cause and something of the mechanism of production of a disease opens at once a way to proceed against its origin. The dependence of many cases of glycosuria on chronic pancreatitis is no longer doubted. That glycosuria of this character is a comparatively late development in a very chronic inflammatory process may be assumed from our knowledge of experimental pancreatic diabetes. We know from recent operation records that chronic pancreatitis is most frequently associated with cholelithiasis. The rational treatment of chronic pancreatitis has been rendered possible by the information obtained from surgery of late years. For our present knowledge of the subject we are in great part indebted to the work of Mayo Robson. This authority and his co-worker, P. J. Cammidge, in the present number of this journal, enter a strong plea for the early operative treatment of cases of chronic pancreatitis in order to anticipate and prevent the further progress of the interstitial change, with perhaps an eventual diabetes. They disclaim the possibility of curing by such means a glycosuria when once established, and urge the claims of early drainage as a preventive measure only. The frequency of glycosuria in chronic pancreatitis is relatively not great and it is of course impossible to forecast its appearance in any given case, still the danger of such a complication undoubtedly exists in every case, and serves to add a further indication for early operative treatment. Unfortunately, the symptomatology affords us no absolute criterion as to the pancreatic or non-pancreatic nature of any case, and attempts at clinical distinction are difficult, if not impossible, except in cases with a past history of pancreatic disease or cholelithiasis. Robson and Cammidge depend upon the so-called "pancreatic reaction" in the urine for the recognition of pancreatitis. This test, first described by Cammidge in 1904, has been further elaborated and improved, and is again advanced by its originator as a reliable diagnostic method, after an experience covering 800 applications. Its employment in other hands has apparently been less than satisfactory, if we are to judge from the comparative silence regarding it in the literature of the past two years. This is hardly surprising in view of the technical difficulties of the method and the necessity for skill and experience in interpreting the results. The emphatic reassertion of his claims for the test, by Dr. Cammidge, and the testimony of Robson as to its clinical value will reawaken interest in the method, and result, it is hoped, in establishing the claims of its discoverer and his associate. The work of these authors in the elucidation of diseases of the pancreas is to be commended as a distinct advance in clinical pathology. Their conservatism is noteworthy and the emphasis of their teaching is chiefly placed upon the factor of prevention. If the diagnostic criteria they lay down can be established by experience, it may become possible to recognize this class of cases in their incipiency, and to successfully deal with them by drainage before the pancreas has become so encroached upon by disease as to be reduced in functional capacity below the minimum necessary for metabolism.

ARTHUR R. ELLIOTT.

TRANSACTIONS OF SOCIETIES

CHICAGO SURGICAL SOCIETY

A clinical meeting was held at the MichaelReese Hospital, November 1, 1907, with the President, DR. A. J. OCHSNER, in the chair.

1. CRUSHING INJURY OF THE FOOT

DR. LOUIS A. GREENSFELDER: The first case that I wish to show you is that of a boy, twelve years of age, who was admitted to the hospital on July 31st, at 10:40 A. M. In crossing Madison Street, between Franklin and Fifth Avenue, he was struck by a west-bound Madison Street car and knocked unconscious. He was taken to the Cook County Hospital shortly after the accident and remained there for two days.

On admission to the hospital the patient was in a state of collapse; quite delirious; temperature 102.6°. The fifth tarsal and metatarsal bones of the left foot were totally destroyed; the astragalus was badly crushed and disarticulated; the soft parts were crushed to a pulp; the limb was swollen and red to above the knee. In the right foot the first, second and third metatarsals were crushed; the muscles and tendons were badly bruised; the foot was greatly swollen and red to about two inches above the ankle.

When this patient was admitted to the Michael Reese Hospital, the wound was simply opened, irrigated and swabbed with a 95 per cent solution of carbolic acid, and this followed by the application of alcohol. The wound was dressed from five to six times a day; a line of demarkation was allowed to form and to amputate itself. Nothing has been done excepting to cleanse the wound three or four times a day at first, and now it is dressed about once a day.

I simply present this as a case showing the results of conservative surgery. We have saved a large portion of the foot as well as the entire ankle, and we think with a little plastic work we will have quite a serviceable stump for this patient. The only interesting feature about it is to show what conservative surgery may do for such a patient.

2. ARTHRITIS DEFORMANS

The second case I wish to show is one that was brought to me by a colleague this evening as one of arthritis deformans. The history, briefly, is this: The present trouble began last January. The first thing the patient noticed was that the great toe of the right foot became swollen, red and painful. The joints were immovable without edema; the joints of the toe were involved, and the trouble rapidly spread so that both ankles became involved, one at a time, and then changed from one ankle to the other; it went up to the knees, and these were similarly involved, and then the hips were affected. The condition then traveled up the shoulders, extended to the elbows and fingers. The condition in the joints seems to change from day to day. At present the patient holds the neck rather rigid, and motion of the lower jaw is impaired. According to the previous history, patient had articular rheumatism when six years of age, from which he recovered without any ill effects. The history is negative as to other diseases, except he had measles when a child. He has never had tonsillitis.

On physical examination this patient presents nothing but a mitral stenosis. He has a scoliosis; he has an ankylosis of the atlas in the axis. He has a partial ankylosis of the jaw. The X-ray shows a large exostosis opposite the (?) cervical vertebræ, in all probability, an arthritis deformans. There are no nodes to be felt anywhere. He has no enlargements of the spleen, liver or glands.

The case simulates to some extent cervical Potts' disease. We were unable to make an examination of the pharynx, because the patient cannot open his mouth sufficiently far to do this.

I present this case from the standpoint of differentiating between cervical Potts' and an arthritis deformans. He has no glandular enlargement anywhere; the liver is not enlarged, nor is the spleen. There is no evidence or history of tuberculosis or syphilis.

3. SARCOMA OF THE NECK

This patient is 28 years of age and was first seen by us two years ago, at which time she had a small swelling in the nape of the neck. It felt like, and was thought to be, a lipoma. The opinion given was that it was a lipoma, harmless, and could be removed any time it gave trouble. It gave the patient no inconvenience until three or four months ago, when it began to enlarge suddenly and took on a different shape and contour, and we advised

then that it be removed. This was done under local anesthesia, we believing that it was not deeply situated, but on cutting down upon the growth we found that is was situated just on the spinous processes of the fourth and fifth cervical vertebræ, and it was with great difficulty enucleated. After enucleation it proved to be a rare form of sarcoma. Dr. Herzog will demonstrate the specimen as well as make the pathological report. It started as a lympho-adeno-cysticum, and later developed as a sarcoma.

Dr. Maximilian Herzog: This very large tumor which is here shown is one of the most interesting neoplasms that we have to deal with. It is particularly interesting from a histogenetic standpoint. These tumors were described first a number of years ago by Birch-Hirschfeld, and the name given to them is embryonal renal adeno-sarcoma. A number of cases have been reported in Europe, and about six years ago I reported the first case in America. The patient was operated upon by Dr. D. Lewis.

Our present case is an enormous tumor. In certain parts of this and other tumors of the same type the tissues are absolutely epithelial, and if these neoplasms had no other structures than these, they would have to be classified as a carcinoma, or as a malignant epithelial neoplasm. But in other parts they show sarcomatous tissue, embryonal connective tissue, and not merely ordinary fibrous connective tissue, but we are liable to find striated muscle fibers, and in some places we find even bone and cartilage in them. So they are tumors very much mixed in type.

It has been difficult to trace the origin of these tumors. Wilms made the first attempt to do this. Let me say a word or two with reference to their histogenesis. You know that the permanent kidney is really the third urinary organ we have. There is the pronephros first, which is a very transitory structure in mammalian animals; then the Wolffian body, an important structure, and then develops the permanent kidney, as you know. The nephrotome, from which the temporary and the permanent kidneys develop is cut off from the myotomes early in embryonic life. Wilms believes it is simply the mesenchyma of the myotome which gives rise to these embryonal adeno-sarcomata; but I believe that it is not merely the latter, but a complete portion of the myotome which becomes included in the nephrotome, because in these tumors we find all the structures which normally develop from the myotome, viz.: muscle, cartilage, bone.

These tumors then grow in the kidney, not from the kidney tissue proper, but from embryonal inclusion of the early myotome. They in fact often displace kidney tissue, so that it may be atrophic, in consequence of pressure atrophy. These neoplasms generally do not give rise to hemorrhages as do other tumors of the kidney, for instance, the very vascular hypernephromata or adrenal tumors.

In this case the post-mortem was made by Dr. Kaltnisky, interne and assistant in the laboratory, who removed all the internal organs en masse. When, later on, I dissected the mass which was conglomerated together by numerous adhesions, I at first thought I was dealing with a lympho-sarcoma of the mesentery, as the tumor had grown partly into the mesentery and it appeared that the mesentery formed its pedicle, but as soon as sections of the tumor were made I recognized that this was a mistake, because the tumor presented that peculiar structure which is only found in these embryonal adeno-sarcomata of the kidney. The specimen shows a congenital anomaly, a horseshoe kidney. That is one anomaly which makes it probable that there were present some other anomalies, namely, embryonal inclusions. However, I do not know exactly from what part the tumor sprang, because I have not yet dissected the kidneys, because we want to have the tumor photographed.

You will see under the microscopes a section from the former case previously reported, a section from to-night's new case, also a section from a renal tumor of the same kind in a pig. I have during the last year had a chance to see a number of such tumors in pigs which show that the embryonal renal adeno-sarcomata also occur in the lowet animals.

4. EMBRYONAL RENAL ADENO-SARCOMA

The next case is that of a child which interested me from a differential diagnostic standpoint. I wish to present a specimen in connection with this case. The child was kicked in the abdomen while playing with another child on July 4th. There was very little complaint made at the time, but at night the child cried with severe pain in the abdomen. This pain became more severe until on Saturday morning a physician was consulted, who prescribed compresses, etc., with no relief. The child was admitted to this hospital on July 7th. On examination we found a small tumor, apparently the size of a hen's egg just above the pubes, which led us to believe that we were dealing with a hematoma. We simply allowed the patient to remain in bed, treated her, and watched her carefully, believing at the time we had a simple hematoma, and not an intraperitoneal growth. The mass began to grow. About July 29th, six or seven weeks after her admission to the hospital,

this tumor showed no disposition to disappear; on the contrary, it became larger and somewhat softer, and we thought yet it was a hematoma that was breaking up. We advised opening the abdomen, which was done, and when the peritoneal cavity was opened there was an enormous gush of blood. I enucleated a small piece of the tumor mass, which was examined microscopically, but the hemorrhage was so severe that nothing further could be done. We therefore packed with iodoform gauze and put the child back to bed. This tumor continued to grow until it occupied the entire peritoneal cavity, and the child died on October 18th.

The post-mortem and pathological findings of these last two cases will be described by Prof. Herzog.

1. CARCINOMA OF THE SUPERIOR MAXILLA

DR. L. L. MCARTHUR: I have first to present to you a case not of interest because of its rarity, but as illustrating the fact that some of the apparently hopeless cases may still gain some relief by surgical interference.

I had sent to me a year ago the worst case of carcinoma of the superior maxilla with which I have had to deal or have attempted to operate upon. The tumor was so large as to prevent the closure of the mouth. There was difficulty in swallowing because of the extension of the tumor backwards, and there was also bulging and displacement of the eye. The usual incisions were made which are employed for trouble of this nature, and after reflecting a flap of skin in the usual way (the incision can be seen along the eye, down around the nose, and through the upper lip), the entire superior maxilla, a fair portion of the left palate, and as far back as the tonsil, were removed.

I show the case not because these operations can be performed, but because we have seen here again, after the lapse of some months, a small recurrence within the mouth about opposite the pterygoid plates. This was treated energetically with the X-ray, with a complete clearing up of that recurrence and the patient's restoration to very good health. We feared, because of the extent we had to go to the side, paralysis of the palpebral muscles, but succeeded in getting along without that. The patient has now come back to the city in the last few days, for the purpose of having an obturator made and a set of teeth to supply that portion of the jaw which has been removed. There is no sign of recurrence.

The X-ray, when recurrences have taken place after one of these major operations, offers us some hope.

2. EXTENSIVE CARCINOMA OF THE BREAST

The second case that interests me, and I thought it might be of interest to the Fellows of this Society, is one of extensive carcinoma of the breast which was operated on five years ago. Following the practice which has been in vogue in this city, the prophylactic use of the X-ray was recommended in her case. After a number of weeks' treatment the patient failed to obey instructions and as a result had a small recurrence take place in the line of the cicatrix. Returning to the Röntgenologist, he sent the patient back to me, believing the growth more extensive than ought to be left to the ray. On examination I found a recurrence involving two ribs in the precordial region, immovable, and apparently deep in the intercostal muscles. I therefore resected the chest wall. In so doing had to expose the pericardium and the lung. I present the case to show that extensive resection of the chest wall can be made in a patient who is in ordinary good health. The lung and heart were exposed. We could take the lung in the hand. After having done all the work necessary on the chest wall we closed the wound firmly, then with an aspirator needle introduced through another point in the chest wall withdrew the air which entered the chest wall during the time of operation. Union took place in the chest wall. The hemorrhage was checked before closing the wound, to avoid hematothorax. We succeeded in obtaining primary union. This operation was done a year ago last August. Since the chest wall has been removed, you can, skin only intervening, feel the heart.

This case shows it possible to open the chest wall. After the surgical work has been done you can close the chest cavity, aspirate the air which gained access temporarily, and after such access can have the normal pleural condition restored.

3. MALIGNANT EDEMA

I had the promise of three patients to appear here to-night, each of whom had been infected with the organism of malignant edema, and each of whom has been cured. I am sure their lives were saved by a line of treatment which in desperation I tried upon this patient some thirteen years ago.

This patient, about thirteen years ago, received an injury in an elevator accident, as I recall it, and fractured his femur at the lower fifth. It was one of those fractures that produces a posterior displacement, and pressing upon the nerves and vessels was endangering the circulation in the lower part of the extremity. I therefore advised wiring, which was done. After one day's preparation to

carefully antisepticize the parts, the bones were wired in position. There was no difficulty attending the operation. This was done about four o'clock in the afternoon. It was done during the period of reconstruction in the hospital, when the tiling in the operating-room was torn up, and there had been during that day considerable dust in the atmosphere. The same day, within six hours, I was called because the patient had a high temperature, a great deal of pain, accompanied by a chill. This coming so soon after the operation alarmed me. I found the wound reddened, irritated, emphysematous, and recognized that probably we had a case of acute malignant edema to deal with. There being a medico-legal factor in the case, the young man being an employe of the President of the Board of Trustees of this hospital, I desired to be unusually careful, so secured Dr. Fenger at midnight. He examined the patient, and the moment he felt the thigh, he said, "Malignant edéma!" I asked him, "Shall we amputate?" He replied, "No; in the morning it will be in groin, and by noon it will be at umbilicus, and by night the patient will be dead. Good-night."

This was very discouraging to a young surgeon, and I felt I could not give the patient up without an attempt, at least, on a theoretical basis to save him. I went down to the drug room for salicylic acid and alcohol; I boiled salicylic acid in alcohol to get as concentrated a solution as possible. In cold alcohol salicylic acid is soluble to the extent of one part in two. In boiling the alcohol I used all the stock the druggist had. This hot alcoholic solution with a hot syringe was injected around the entire area that was emphysematous, thirty, forty, or fifty injections being made, injecting two or three drops each time, trying to wall off with the salicylic acid the area of infection. From that time the patient began to improve. The area that had been infected with the organism of malignant edema sloughed away; a portion of his quadriceps femoris, also the vastus internus and externus sloughed out, but eventually he made a good recovery. Of course, I had opened the wound widely to find out what the trouble was, whether it was from catgut we were using at that time, which was dipped in carbolized oil, or whether it was from the tearing up in the hospital, but we were unable to determine. But in spite of the awful infection in the neighborhood we secured good bony union, and the man has now a useful limb.

My experience in this case led me in the next cases I got to do the same thing. My idea is that one can put in a barrier of a slowly soluble antiseptic which will prevent the spread of this infection, and by putting a barrier in the case I have reported, the man lost only that which was infected. In a case in which there was an injury of the hand the process was limited to the hand, and the portions of the dorsum of the hand sloughed off. In a third case which occurred last winter at St. Luke's Hospital, the man, having received a double crushing injury of the feet, had following within forty-eight hours malignant edema. An attempt had been made to save the feet, because the circulation was good in the soft parts. There followed an acute malignant edema on one side. The opposite side was not infected with the organism. Inside of forty-eight hours after his admission, and about twenty-four hours after it was discovered to be malignant edema, the condition of the patient was so desperate that he was taken to the operating-room for amputation. I did not dare amputate the foot, because I felt sure he would die on the table if I did so. I asked one of my assistants to go to the drug room, boil in alcohol salicylic acid to saturation. I tried this again, and saved the life of a third patient. These are the only three cases I have had of malignant edema. Fortunately, these cases are rare. From the favorable experience I have had, I think any of you will be justified in trying this treatment.

4. RECURRENCE OF EPITHELIOMA OF THE LIP FROM THE USE OF THE X-RAY

While showing cases that have been benefited by the X-ray, and I have had many of them that have been fully protected and have gone on for six or seven years without recurrences, it will occasionally happen that we have a very decided recurrence. The case I now present to you is in this regard a phenomenally strange one. This man was operated on two weeks ago for epithelioma of the lip. The lower lip was removed throughout three quarters of its extent. Why was it removed? A year ago he had an epithelioma of the lip which was dissipated by the X-ray treatment in the hands of Dr. Pusey, but returning to Dr. Pusey with a small crust at the site of the old trouble, he again started the treatment. Instead of the X-ray improving the condition, it burst out afresh so that inside of twelve days the condition was most alarming. Here was a case in which under the use of the X-ray the growth seemingly disappeared, then suddenly flared up, and could not be made to disappear with the X-ray.

1. NEUROMA OF THE ULNAR NERVE

DR. DANIEL N. EISENDRATH: The first case I show you is one of interest on account of its pathology and surgical treatment. This young

man entered my service last summer. He is fifteen years of age, and about three weeks before coming to the hospital he began to have pain and swelling on the inner side of the arm at the same location where he had been operated on twice before, once by Professor Senn, when seven years of age, and once at the age of four. Recurrence followed each operation. When he first presented himself here there was a spindle-shaped mass situated upon the inner side of the arm, which was about three to three and a half inches in length, and extended along the line of about the ulnar nerve, and seemed to have communication with the scar, which at that time was white. On touching one particular point in the scar it was found to be excessively tender. We made a diagnosis of a fibro-neuroma, with the suspicion, on account of its having grown rapidly, of possible malignant degeneration of the fibro-neuroma.

The question came up as to what to do for this boy.

These illustrations will show you what we found. Upon first making an incision, the first thing I did was to make an incision which included all the scar tissue and some of the neuromatous mass attached to the main tumor. Then there was exposed to view this tumor which we felt externally. It was distinctly a neuroma of the ulnar nerve, and I thought that it was all we had to deal with. But upon lifting it and dissecting it away from the ulnar nerve, I found there was a second tumor which lay beneath it, and which was attached to the median nerve. The relation of the two tumors is shown in the illustration which I will pass around. The first tumor was removed, and the second tumor exposed. When the two tumors were removed, the condition of affairs was as shown in this last illustration (exhibiting photograph). The operation showed that the condition of both nerves was about the same. If this (indicating) should represent one of the nerves, there was attached to it a tumor which was elongated and into which ran at least one half of the fibers of each nerve. Strange to say, in spite of the fact that a large number of these fibers ran into the nerve, there was no paralysis, nor any loss of sensation. The patient was carefully examined by Dr. Goodkind before the operation, and we did not find any evidence of either loss of sensation or motion. The problem was how to deal with this case. If I dealt with it as the pathology of these tumors teaches us, the only thing would be to resect the ulnar and median nerves and do a plastic operation. On account of extensive involvement of both nerves, having only the radial nerve to fall back on, I would have had a difficult task. I extirpated the neuroma as far as I could from the nerve to see whether there would be a recurrence. I did this by simply dissecting the tumors away. The result is shown in the illustrations. Following the operation he had complete loss of sensation and motion of the whole hand, but has gradually regained sensation and motion. This was about three months ago. There is impairment in flexion. He is working as a clerk. Sensation is perfect, and there is no reaction or degeneration. There is no normal resistance to faradic and galvanic electricity. If you put your finger over the arm like this (indicating), you will strike the neuromatous spots. At the time of the operation I found that the scar in the skin was attached by a number of fibers to the main tumor. I excised this completely, and the curious feature is that the tumor showed extensive myxomatous degeneration or a mucoid condition, so that when the tumor mass was opened, a large amount of jelly-like material escaped.

DR. MAXIMILIAN HERZOG: The pathology of neuroma can be dismissed with a few words. Most of the tumors called neuromata are not pure neuromata. Pure neuromata are exceedingly rare, and most of the tumors that have been diagnosticated as neuromata are not neuromata at all, but fibromata or fibro-neuromata. This is a case of fibro-neuroma, as the microscopical examination clearly shows. You will find a lot of loose connective tissue filled with edematous material, and then you find in various parts of the tumor nerve fibers. They are atypical, but they show the axis-cylinders and the white substance of Schwann, the myelin sheath. It is known that most of these tumors first show themselves in childhood, and they all have a tendency to recur after removal. These tumors are very uncommon in horses. They are not really malignant, and they can be likened to keloids. The latter, like the former, both in man as well as in horses, have a tendency to recur after removal, but they are not truly malignant, and they do not form metastases.

2. FRACTURE OF EXTERNAL CONDYLE OF HUMERUS

DR. D. N. EISENDRATH: The second case is a very interesting form of fracture. This young lady sustained a fracture of the external condyle of the humerus about twelve years ago. I did not see her until early this summer. The interesting feature about it is this: She has very marked cubitus valgus. She now comes to us to know whether anything can be done surgically. The cubitus valgus is very marked, and in addition to that, X-ray shows the external condyle to be displaced forward; the radius has been carried with it, as you can see by an examination of the

arm, so that the question comes up as to whether operative interference will be of any avail. A skiagraph shows the external condyle displaced forward, so that it interferes somewhat with the motion of the joint. The radius has been carried forward with the external condyle.

3. TREATMENT OF FRACTURES OF THE NOSE WITH A NEW SPLINT

Along the line of fracture, lately we have had a very agreeable experience with a splint in the treatment of fractures of the nasal bones. With the aid of one of the instrument houses in this city I have made a slight modification of the original splint suggested by Cobb and Coolidge, of Boston. You know how difficult it is to keep dressings for nasal fractures in place, and especially in patients whom one must treat in an ambulatory manner and sometimes does not see for a few days. I have used this splint in four cases; Dr. Greensfelder has used it in several, with excellent results. I have made a modification in the adjustment of these screws. We found it would slide off the nose at times, so that I use a little fixation apparatus over the lower portion of the splint. This can be adjusted to each patient. These pads, which you see, are placed on each side of the nose. The illustration of the original splint by Coolidge is given in Scudder's book on Fractures, and the splint is not only adapted for those cases where there is an actual fracture of the nasal bones, but where the lateral cartilages have been separated from the nasal bones and sprung out. It can be so adjusted that it will stay on quite firmly. We let the patient apply it for about half an hour to an hour in the morning, and about the same length of time in the evening. It is especially suited to those cases in which there is a separation of the lateral cartilages from the nasal bones, and in those cases where there is great tendency to displacement. We correct deviations of the nasal septum which are quite frequent in these cases.

4. BISMUTH IN THE DIAGNOSIS OF STRICTURES OF THE ESOPHAGUS

I want to show you the use of bismuth in the diagnosis of strictures of the esophagus. I have here three skiagrams of cases of strictures of the esophagus. One patient was shown about two years ago before the Chicago Medical Society. This is the skiagram from the case of a gentleman who had a syphilitic stricture of the esophagus, and died at the Alexian Brothers' Hospital. The skiagram shows dilatation above the point of stricture, the bismuth giving rise to a shadow very deep in contradistinction to the rest of the picture, showing trickling of the bismuth down opposite the stricture in the esophagus. The method of doing this is to let the patient eat bismuth with bread, or make a thick emulsion with water and let him swallow it.

The second skiagram shows in a very clear manner the use of bismuth. The bismuth is shown high up in the esophagus. It shows also lower down. We see a trickling of the bismuth, showing a great narrowing of the esophagus as we get down farther. A third case is also very typical, showing the bismuth extending down into the esophagus the normal width, and then stopping at the bifurcation of the bronchi and does not begin again.

5. FRACTURES OF THE METACARPAL BONES

At a previous meeting of this Society I showed several cases of fractures of the metacarpal bones. Since then I have run across in my own practice several more, and thanks to Drs. Ridlon and Ryerson I am able to show photographs and skiagrams of some more. I will pass these pictures around. Here is a case of Dr. Ridlon's, showing extreme deformity, with fracture of the first, second and third metacarpal bones. The picture here of the so-called Bennett fracture, or fracture of the metacarpal bone of the thumb, is that of Dr. Ryerson's case. The rest of them are all our own.

This picture is particularly interesting. The man sustained a fracture of the head of the metacarpal bone of the index finger by the crank of an automobile, and it was impossible to recognize any injury without the use of the X-ray. This picture was taken four weeks after the injury and shows a typical fracture. At the same time, I want to pass around prints of fractures that are so difficult to recognize without the aid of the X-ray — fractures of the phalanges, and show a number of patients with fractures of the metacarpal bones. Some of these were shown before. The fractures of the metacarpal bones are transverse and spiral, and may occur most frequently in the shaft of the bone. Here is a fracture of the first and second metacarpal bones. We make it a practice in every injury, no matter how slight it is, to take an X-ray, because we run across so many fractures of these bones. Here is a fracture of the metacarpal bone of the little finger; here is another fracture of the metacarpal bone of the index finger from the automobile accident. In this connection I would like to urge and suggest the taking of X-ray pictures in two different directions, as it is impossible to determine or to judge of the amount of anterior and posterior displacement without a second picture. I show you a typical fracture now of the

metacarpal bones following a crushing injury of the hand; another of fracture of the phalanges, so-called baseball finger, treated as a sprain at first, in a boy, until the X-ray showed it to be a fracture of the first phalanx of the thumb.

DISCUSSION ON THE CASES PRESENTED AND DEMONSTRATED

DR. ARTHUR DEAN BEVAN: I was very much interested in the first case shown by Dr. Greensfelder of injury of the foot, where no amputation had been made, and where the tissue had been allowed to slough off. The question occurred to me at the time as to the future of that foot from the standpoint of usefulness. I am quite in sympathy with the conservative handling of these crushing injuries of the hand and foot, and this is a beautiful example of what can be done by conservative treatment; at the same time, there are certain facts that confront one in a case of this kind that must be met from the standpoint of the future usefulness of the limb. First of all, as it is now, there will be a large scar eventually at the point of pressure which will probably break down rather readily under friction of a shoe, so that I do not believe that leaving the limb as it is would be a good plan. From some experience in railroad surgery, it occurs to me, and it is my impression, that the best way of handling that foot would be now to make a Pirogoff. If a Pirogoff is made (and there seems to be plenty of tissue), it would do away with this large tender scar. It would leave a useful limb — in fact, a much more useful foot than he can possibly have with the present foot. The question might be raised as to whether a Pirogoff is preferable to an amputation at the junction of the lower and middle thirds and the wearing of an artificial limb; but I believe, from my experience with a number of Pirogoffs, that would be the best way of handling this case.

DR. CARL WAGNER: I was very much interested in the method described by Dr. McArthur of walling off the point of infection in these cases of malignant edema with salicylic acid. Prof. v. Nussbaum used to inject carbolic acid for the purpose of walling off infection in these cases, especially in erysipelas, but so far as I remember, it was only a success in a few cases. I am glad to know that salicylic acid boiled in alcohol and used in the manner Dr. McArthur has described has been so successful, and it can be recommended for further trial.

DR. SAMUEL C. PLUMMER: There is one thing I noticed in the skiagrams of dilatation of the esophagus in cases of stricture, and that is, they all seem to be high up in the esophagus, whereas we know the great number of cases of stricture of the esophagus occur near the lower end. It seems strange that Dr. Eisendrath should have three cases in succession with the stricture so high up.

DR. D. A. K. STEELE: With reference to the second case presented by Dr. Greensfelder, the case of neoplasm of the kidney in a young child, the lesson we should learn from that and all other cases of neoplasms of the kidney, particularly sarcomas, is that we should not only be taught to make a diagnosis, but be taught not to operate. The operation does no good. From the experience I and others have had, who have operated on young children with kidney tumors of a malignant type, with sarcomatous changes, it has been found that the operation is only beneficial for a few weeks or a few months. Usually, operation is promptly followed by death. In these cases many of the tumors are prenatal; they exist before the birth of the child, and when young surgeons are called in to see a child a year and a half or two years old, with a large rapidly growing abdominal tumor, the question of differential diagnosis appeals to them, particularly in a female child, and I used to believe that after having made a diagnosis of embryonal tumor of the kidney, an early operation is likely to be beneficial, but after an experience with three or four of these cases and finding a uniformly fatal termination within a year after operation, I have desisted and contented myself with making the diagnosis, but giving an unfavorable prognosis. These patients are likely to die within a few months. In this particular case that has been presented we have the anatomical abnormality of horseshoe kidney, and it was difficult to differentiate as to whether it is a tumor of the kidney or of the mesentery, which adds to the interest we have in the specimen. I would like to have Dr. McArthur speak in his closing remarks with reference to the depth of the injection in cases of malignant edema.

DR. MAX REICHMANN: I wish to say a few words in reference to what has been said by Dr. Eisendrath about bismuth. The use of bismuth in finding strictures of the esophagus is not very good. We prefer to use hollow tubes that are filled with mercury and which are introduced into the esophagus, and show a beautiful picture. Furthermore, Müller, in Hamburg, manufactures a tube that is now made out of rubber combined with lead, which is introduced into the esophagus and leaves a clear shadow.

A few words with reference to the case of the boy with an affection of the neck, presented by Dr. Greensfelder. A picture shows clearly some bony neoplasm in the region of the atlas and epis-

tropheus, but the nature of the disease cannot be determined by the X-ray. It is similar to a syphilitic neoplasm; it has a similarity to a tubercular neoplasm, but its most striking similarity is to arthritis deformans hypertrophica, as we so often find it in the hip-joint.

DR. EDWARD H. OCHSNER: In reference to the case reported by Dr. McArthur in which he resected several ribs followed by pneumothorax, the question arises whether it is desirable to aspirate the air or not. About eight weeks ago I resected the greater portion of the left eleventh rib for pressure neuritis of the intercostal nerve due to scoliosis, and contrary to all anatomical text-books the pleural cavity extended about an inch and one half below the lower border of the twelfth and eleventh ribs, consequently I opened the pleural cavity for a long distance. After closing the wound carefully the question naturally arose in my mind as to whether or not it would be desirable to aspirate the pneumothorax. I have followed the rule that when a patient is getting along well to let him alone. This patient did not seem to be discommoded in the slightest by the pneumothorax, and consequently interference did not seem warranted. It taught me that letting air into the pleural cavity and leaving it in is not a serious matter, and that aspirating it is a procedure which is not entirely without risk and certainly seems unnecessary, for sterile air is absorbed in a very short time.

In reference to Dr. Eisendrath's case of neurofibroma I wish to briefly report a case which came under my care about four weeks ago, which suggested to me the possibility of using alcohol injections in the treatment of these recurrent growths. The patient in question came to the hospital after having had seven operations for painful neuromas of the brachial plexus, following an injury to the brachial plexus by having a tree fall on his shoulder. Practically everything had been tried, including repeated resections of the nerves and osmic acid injections. It occurred to me that it might be well to try the treatment which Dr. Patrick has popularized in this city for trifacial neuralgia. I took a hypodermic needle and injected about 2 c.c. of 70 per cent alcohol into each painful spot. The patient assured me that he has had much less pain since this little operation than he had previously. Possibly the pain will recur, but if it does the little operation can be repeated once a month with less discomfort to the patient than his constant excruciating pain, and with less danger than if he should become a morphine habitue.

DR. L. L. MCARTHUR: To answer Dr. Steele's question, I would say that an effort was made to entirely surround both by deep and superficial injections the area of invasion with the malignant edema; that in each of these cases the extension of the gangrenous process stopped before it reached this line of injection, and the tissues, which were infected, invaded, swollen, edematous and red, began to subside and later sloughed off, as shown by the loss of tissue in the case presented, and, as I had hoped to show, by the cases that promised to be here, but did not come.

As to Dr. Ochsner's statement with reference to doing something unnecessary, I would say that there is no danger of puncturing a lung collapsed by the condition which obtains with a pneumothorax, especially if that needle be of the type which should be used; that is, with guarded point, such as originally was sold with the Allen surgical pump, there would be no danger of injuring the lung. A lung in a normal condition is an expanded lung and not a collapsed one, and it is certainly acting up to the light that we have when we try to bring a lung back into something like its normal condition. It is not a condition similar to that recommended by Dr. Murphy, where the lung itself must be put at rest. The respiratory apparatus has been disturbed by the operation very decidedly, and collapse of the lung might easily harm were it allowed to remain unnecessarily long. As it is not necessary, I believe it is wise to reduce the amount of air in the pleural cavity. I do not believe it can all be aspirated, but an approach to the normal may be had.

Dumreicher, of Vienna, appreciated the anatomy of the pleura when attempting to suture the kidney to the last rib. He found by a fatal case that he sutured through the pleura. A septic pleuritis had followed the sepsis of a surgical wound which occurred in the suspension of a kidney from the twelfth rib.

DR. LOUIS A. GREENSFELDER: I quite agree with the statement made by Dr. Steele that in a case of sarcoma of this type it would not be wise to operate and remove the kidney; but if Dr. Steele recalls the presentation of the case, he will doubtless remember the fact that we were not at all sure it was a neoplasm. On the contrary, my colleagues, who examined the child carefully, also believed it was hematoma, and not a neoplasm of the kidney. They believed it was not malignant.

The case was shown very largely for the purpose of illustrating the difficulty of making a differential diagnosis in cases of this kind where we have absolutely nothing but a history of traumatism and a gradual swelling.

In answer to the remarks of Dr. Bevan, I will say that if we found the line of demarcation the

foot would have to be subjected to radical surgical interference. We thought it wise, however, to give the child, for the time being, the benefit of a doubt, and I do not think such a scar will prevent the proper fitting of a shoe.

With reference to what was said by Dr. Reichmann, I will say that I had hoped some of the members would enable me to make a differential diagnosis in the case presented, as to whether it was one of arthritis deformans or tuberculosis. Personally, I am unable to make a differential diagnosis between the two conditions.

DR. D. N. EISENDRATH: With reference to the point made by Dr. Ochsner, we found out last summer, when we studied the matter of pleural reflection in relation to the treatment of subphrenic abscesses, that the old teaching in regard to reflection of the pleura was erroneous, and only one of the later books on anatomy gives the correct reflection of the pleura, and that is Cunningham. We dissected a portion of formalized cadavers and found the pleura extending much deeper than we have been ordinarily taught, and that it included the greater portion of the twelfth rib, coming down to the twelfth dorsal spine, much deeper than we have been accustomed to think of it.

DR. MAXIMILIAN HERZOG: The specimen I here show you is from the neck case described by Dr. Greensfelder. At first, the tumor grew slowly, and not until recently did it begin to grow rapidly. Dr. Greensfelder was under the impression that it was a perfectly harmless, non-malignant tumor. Examination, however, showed that it probably arose originally from a benign lymphangioma cysticum. You will see under the microscope cystic spaces, but these are separated from each other by bridges of embryonal connective tissue; hence it looks as if the tumor had become malignant.

As to the next case, I will say that a provisional diagnosis only has been made. The patient was a girl, virgin, 23 years of age, who, for the last six weeks or more, had headaches, irregular pains, but during the last month these symptoms became more acute. She complained of severe headaches over the entire head. These were persistent and continuous. There was no particular tenderness elicited on pressure. She complained also of severe pain in the upper dorsal and lower cervical regions. It was with difficulty that she could flex the head on account of the severe pain it caused. She believed that her condition was due to catching cold, attributed to exposure and wet. Her past history was negative. Ophthalmoscopic examination, made by Dr. Snydacker, revealed intense papillitis.

The post-mortem diagnosis was as follows: Hypertrophy of the myocardium, particularly on the left side; atheromatosis of the beginning of the arch of the aorta and of the beginning of the coronary artery; fibrous adhesions of the lungs and passive congestion; hypertrophy of the spleen, with perisplenitis at the upper surface; cyanosis of both kidneys and liver; old fibrous cicatrices in the cortex of the right kidney; hemorrhage at the pons and into the meninges, medulla, cervical and thoracic portions of the cord, from rupture of an aneurysm or aneurysms at the base of the brain.

In making a microscopical examination I found that the internal organs, particularly the liver and kidneys presented such changes as might be designated as a moderate fibrosis, moderate increase of interstitial connective tissue, and at the site of the hemorrhage I found the following condition: The vessels of the pia arachnoid, particularly the veins, show a periphlebitis and mesophlebitis, and occasionally you will find a periarthritis. Bacteria were not found. What was the cause of that condition?

My provisional diagnosis was lues hereditaria tarda. Aside from that, I could not make any diagnosis. We have atheromatous changes in the large vessels; we have moderate fibrosis in the liver and kidneys; we have these changes in a woman who did not have acquired syphilis; she was a virgin, as the post-mortem examination showed. She had no signs of acquired syphilis, and we had rupture of an aneurysm at the base of the brain, as I think, in consequence of late hereditary syphilis.

I have some more specimens here which I would like to show, but time is getting short, so I only want to call your attention to a tumor of the brain, which is a true sarcoma and not a glioma. The last microscopic specimen shown is from a case of congenital syphilis. The child lived about a day. The sections are silvered by Levaditti's method. They show innumerable beautifully outlined spirochetæ pallĭdæ.

DERMOID

DR. L. L. MCARTHUR: A young girl, 12 years of age, was sent to me through the kindness of a colleague, Dr. O'Neill, with a diagnosis of appendicitis of severe type, requiring immediate operation. The history is interesting in that it brought up a question of diagnosis. I report the case to get the assistance of the Fellows as to any similar experiences they may have had. As elicited, the history was this: Five weeks before the patient had had the mumps; at the end of six or seven days she was seized with a sharp

pain in the right abdomen, with a recrudescence of temperature, and other symptoms which attend abdominal inflammatory trouble, such as vomiting, nausea, some intestinal obstruction, tympany. These subsided after four or five days, and again, within ten days, were followed by more pain in the abdomen. The second attack lasted forty-eight hours. A third attack, five weeks after the original mumps, was the one in which I saw the patient. At that time her temperature ranged from 102° to 103°, with pulse above 110, with a leucocyte count of 27,000; with rigid abdominal wall over the right lower quadrant; with no tumor to be felt over the abdomen; but by rectal examination a boggy tender mass to be felt in the right side of the pelvis. The next question was to decide whether we had really an appendicitis, a pelvic abscess from a tube, an inflamed ovary from the mumps, or some rare affection. I made the diagnosis of a probable appendicitis, but with the reservation that we might find an inflamed ovary as a result of the mumps, enlarged and swollen. What did I find on operation? A thickened, adherent, non-inflamed appendix in the outer gutter, kinked, and bound down by old adhesions. There was no former history of appendicitis. Satisfied that it was not the source of the trouble, I searched further, and found a condition of the small intestine, near the ileo-cecal valve, like this: A blunt projection, larger than the thumb, and longer than the thumb, projecting from the ileum. This was not inflamed, with no bands, and no mesentery, a typical diverticulum of Meckel, and yet being uninflamed, I pushed that aside, and searching in the pelvis found this large gangrenous tumor which proved to be an ovary with twisted pedicle. I removed the ovary, inflamed and gangrenous. It was a dermoid. Now, was it possible that in the dermoid, dormant there, the mumps made sufficient inflammatory reaction in the remaining ovarian tissue to cause it to swell, and, with the alternate emptying and rising of the bladder, made it twist? For we had a twisted ovarian tumor as the result of the dermoid which had been brought into an active inflammatory condition from the mumps.

DR. L. L. MCARTHUR: With reference to the tumor of the brain presented by Dr. Herzog, and in which he made a provisional diagnosis of late hereditary syphilis, I will say that the diagnosis was attended with great difficulty. It was impossible to tell whether there was a tumor of the brain or not. In fact, I was asked by one of my colleagues on the staff to make an exploratory operation for tumor of the brain, but felt inclined to refuse, as it did not seem quite fitting when the clinical history was considered. During the night of the following day, when I saw her, she sat up in bed and suddenly died. A post-mortem examination was made the next day and showed hemorrhage within the dura, extending down into the spinal canal, covering the base of the brain, some of it old and some of it new, as I recall, so that it seemed to me to answer more nearly the history of a case of pachymeningitis hemorrhagica interna than any other diagnosis which we could make clinically. The specimen was left with Dr. Herzog to work up, and, as I understand, a small aneurysm was found at the base of the brain. I do not understand how various clots of various ages could have made this aneurysm and produced the headaches from which she suffered.

DR. HERZOG: There was no distinct aneurysm found. There were atheromatous changes and luetic changes in the vessels, as shown in the sections. It was shown by Rieder a number of years ago that the vascular changes in syphilis are meso-, para-, and endophlebitis and vasculitis, and only occasionally endarteritis, paraarteritis, and meso-arteritis. These are the changes found in the pia vessels. We have in the kidney and liver fibrosis. I have good reason to believe that the case was one of late congenital lues, or syphilis hereditaria tarda of Fournier. I did not find a distinct aneurysm there, but I believe there must be one there, as she had successive hemorrhages. The blood clot shows the following: Under the microscope it shows blood corpuscles and hematogen, one of the derivatives of hemoglobin; hence it is shown by the hematogen that the clot must have existed a week or ten days. It is clear to me that the woman bled from small aneurysms for eight or ten days, and that her headaches and symptoms were due to that slow hemorrhage, and finally the hemorrhage was so great that she died.

DR. CARL WAGNER: Dr. McArthur's case of dermoid cyst of the ovary complicated with appendicitis in a patient suffering from mumps recalls to my memory a case that occurred in my own practice in which Dr. Green was called in consultation. The patient was a girl, 15 years of age, who had suffered from tonsillitis a few days previous to my first call. At nine o'clock in the morning she was seized with a very severe pain in the abdomen, on the right side, at McBurney's point. The pulse was rapid, respiration very frequent; temperature 104°. I made a diagnosis of appendicitis. Consultation two hours after corroborated this diagnosis. The patient became weak very rapidly, the onset and progress of the attack being of a fulminant and destructive character. On opening the abdomen a large amount

of sero-sanguinolent fluid escaped. The appendix was found slightly adherent, but a mass which I brought from way down out of the pelvis proved to be a dermoid cyst of the right ovary, which had ruptured and caused an enormous hemorrhage and septic peritonitis.

In regard to dermoid cysts being prone to simulate appendicitis, I would like to cite another case the specimens of which I exhibited at the last meeting of the North Side Branch of the Chicago Medical Society. In this case a chronic appendicitis had been suspected by the patient and her doctor, while a nerve specialist pronounced the ailment one of mere nervousness and advised prolonged country sojourn as treatment. I found a very large dermoid cyst on the right side which floated between the intestines so that it easily escaped bimanual examination through the thick abdominal wall. During the operation we spoke of the great scarcity of doubled dermoid ovarian cysts. Almost ready to close the abdominal cavity, I once more brought up and examined an apparently normal left ovary, and had a good view of a tiny little cyst of the ovary about the size of half a bean which I had regarded as absolutely innocent. My attention and suspicion that something more than an ordinary condition might be present was aroused by the bluish hue of this little cystic body. A nipping of its thin membrane caused a few hairs to make their appearance. We removed it and found it densly filled with hair. Thus the somewhat rare pathological condition of a doubled ovarian dermoid cyst existed. Kelly, in his book on Gynecology, records out of 24 dermoid cysts of the ovary only one where this condition was present on both sides.

MEETING OF THE CHICAGO GYNECOLOGICAL SOCIETY, SEPTEMBER 20, 1907

DR. JUNIUS C. HOAG, PRESIDENT
DR. FRANK W. LYNCH, EDITOR

EXHIBITION OF SPECIMENS BY DR. CHARLES B. REED

FETUS COMPRESSUS

Patient aged 36, pxiv. Delivered in the Chicago Lying-in Hospital service in July, 1907.

No history of twins previously. The mature child was born living and weighed 12½ pounds. The fontanelles were almost closed. The "fetus compressus" measures 4 c.m. x 2.5 c.m. and was approximately two months old at the time of death. There were no external manifestations of the death of the fetus that could be learned from the patient.

Frequency. In one series four instances were observed in 475 cases of labor, one fetus being macerated or decomposed, the other normal.

Causes of death in these cases may be summarized as follows: 1. Interference with circulation. 2. With single chorion, for instance, the conditions regarding nourishment are quite difficult; and one egg must suffer. 3. One twin grows faster and absorbs the nourishment of the other. 4. One egg may be accidentally injured, as by a knot in the cord, or by disease, and slow death follows.

Post-mortem Changes. The liquor amnii is absorbed. The fetus is compressed flat. The post-mortem changes are most pronounced the earlier in the pregnancy the death occurs. Sometimes the twin egg is found merely as a yellowish or white flake, and might possibly be mistaken for an infarct on the placental margin.

These cases of course are not certainly diagnosed, but the larger ones may be definitely differentiated. In later months the child's bones resist compression after death and a macerated child will be found.

When the injury is not mortal we find cases of deformity such as acardia, acephalus, etc., depending on the time, the location, and the extent of the injury.

The effect on the pregnancy may or may not be pronounced. Occasionally the pregnancy is interrupted, but usually the patient goes to term. Transient hemorrhage may occur at the time of fetal death, but the diagnosis can only be made after labor, when the time of the hemorrhage and the size of the dead fetus can be correlated.

In labor the dead twin sometimes presents and causes difficulty in diagnosis, or two babes from triplets may be compressed, as Bock and Reuss have observed, while V. Lichen reports the case of a fetus papyraceous that was born before its fellow. Bouchacourt reports the birth of a fetus papyraceous in the third stage. Becker saw one ex-

pelled on the fifth day after labor. Goldberger reports the smallest case on record, the fetus measuring 2.5 c.m. x 1.3 c.m. with a weight of 35 grams. The mature child showed an amniotic skin defect in the axillary line.

The practical significance of these cases rests in the fact that the compressed fetus may remain unnoticed in the uterus after the expulsion of the living child. Cases have been reported where the woman died of postpartum hemorrhage and the post-mortem revealed a retained "fetus compressus" as the cause of the atony.

REPORT OF A CASE

DR. RUDOLPH W. HOLMES: I wish to report a case of perforation of the cervix, rupture of the bladder, with its separation from its uterine attachments. Last Sunday afternoon, September 15th, a woman was admitted to my service at the Passavant Hospital. The interne discovered a transverse presentation with a prolapsed cord and hand. The right labium was much contused and distended with a hematoma. A broad deep cut extended from the labium nearly to the cervix. The patient was in collapse on admission, rapid pulse, and bathed in a cold clammy perspiration. When I examined the woman I found the opening through the cervix admitting two fingers; without the cervix I could pass my hand easily between the bladder and uterus. The retraction ring ran obliquely across the abdomen at and above the navel. In a few moments the woman was delivered by decapitation: the uterus was packed with chinosol gauze. Between three and four hours later, as she had rallied somewhat, aided by Dr. Brougham, a hysterectomy was done, and the rent in the bladder repaired. Unfortunately she died a few minutes after being returned to bed.

The history of the case is meagre, and inconsistent with the lesions found. The husband insisted the midwife had merely examined, and, discovering the pathological condition of the presentation, asked for a physician. The physician who sent the woman to the hospital declares he did not attempt delivery — merely insisted that she go to the hospital; at the time of his visit to the patient he found the lesions described. He further states that while he was arguing with the family over the necessity of hospital care the woman suddenly collapsed.

Another case I had recently in the Lying-in Dispensary service was of rupture of the cord intra partum. Some two years ago this patient had been delivered spontaneously of a baby, which weighed on the dispensary scale just under fourteen pounds. Immediately after expelling the child she collapsed and almost died. About two weeks ago she fell in labor again. The interne recognized a transverse presentation with the hand and cord in the vagina. I did a version and extraction. When the legs were brought down the cord was found between the thighs; the cord was easily freed. The extraction was not attended with any particular difficulty. When the child was delivered the cord was found severed about an inch from the navel. The woman and child both lived.

DR. DE LEE: One interesting thing about the ruptured uterus case was that the symptoms of uterine rupture were not present even when the uterus was ruptured.

DR. HOLMES: The woman was in collapse when I saw her; while the doctor and family were discussing her going to the hospital she suddenly developed symptoms of collapse. I might say that it is a question what produced the traumatisms, especially the vaginal and vulvar ones. Probably the midwife had attempted to deliver her, even perhaps, with forceps, and when she saw the alarming symptoms she asked for help, and intimidated the family so that they denied that she had attempted delivery. It is possible that the bladder and uterine ruptures were due to spontaneous causes; it is hardly possible, very improbable, that the external lesions could occur spontaneously.

DR. BACON: As I understand it, this rupture did not extend through the peritoneum.

DR. HOLMES: The rupture was in the intravaginal portion of the cervix, almost completely separating the bladder from the uterus; the peritoneum was ruptured between the bladder and uterus. The rupture was not in the lower segment as we usually find spontaneous ruptures.

DR. BACON: I would like to ask what was the direction of the tear. Was it longitudinal?

DR. HOLMES: No, it was a transverse tear.

DR. DE LEE: The determining effect of tears of the lower segment from the retraction ring is, physiologically, that the retraction ring ought to disappear.

DR. HOLMES: This was not a rupture of the uterine body, it was in the cervix and surely must have been traumatic. I cannot conceive of these external traumatisms having been produced spontaneously, but the midwife had intimidated the family so they were afraid to tell what had happened.

Dr. Schmauch then read a paper entitled Physiology of Extra-Uterine Pregnancy.

DISCUSSION OF DR. SCHMAUCH'S PAPER.

DR. C. S. BACON: I would like to ask for some consideration by Dr. Schmauch of one of the

points he brought out on a most interesting subject. What, so far as we know, is the essential nature of the tissue in which the ovum is imbedded? The oviblast does not grow everywhere, and whether it grows in the uterus or in the tube, it grows on certain tissues, derived from the Mullerian ducts. I understand Dr. Webster's contention to be that in case of ovarian pregnancy there is probably some inclusion of Mullerian tissue. I do not know that that would be contradicted by the facts brought out by Dr. Schmauch to-night, that the ovum may be imbedded outside the graafian follicle on the surface of the ovary. I would like to hear the essayist discuss that subject, which is, theoretically at least, of considerable interest, and I would like to hear his opinion in regard to the contention of Dr. Webster, that it is probable in cases of ovarian pregnancy the ovum is still implanted in the tissues in the Mullerian tract.

DR. J. B. DE LEE: One interesting point brought out by Dr. Schmauch is the formation of the covering of the hematocele of extra-uterine pregnancy. It has occurred to me the wall of the hematocele is formed of the fetal elements, of coagulation necrosis.

DR. GEORGE SCHMAUCH: In regard to Dr. Bacon's question, I will say I made the statement that besides ovarian pregnancy as described in my case, there is an intrafollicular development of the ovum. We have thought for a long time that the ovum could not be imbedded unless there was some epithelium present, but this has been disproven. We rather expect to find that the epithelium has to be lost before implantation becomes possible. Implantation of the ovum is not possible but in subepithelial tissue. It may be the stroma of the uterine mucosa, or the peritoneal layers, or the ovarian tissue.

DR. BACON: I think I did not make myself clear. I suppose it is now admitted that the epithelium is not essential, but at least some elements of the tissues derived from the Mullerian tract seem to exist in the great majority of all cases of nidation. It seems to be thoroughly well established that, with the possible exception of the tissues in the ovary, the egg cannot live on stroma or connective tissue from other parts of the body; for instance, the mucous membrane of the intestinal tract or any other part of the body. What is the reason? I understand that Dr. Webster holds that the only suitable soil for the growth of ovular trophoblast is tissue of the Mullerian tract. Does Dr. Schmauch regard this supposition disproved?

DR. SCHMAUCH: As far as I know Dr. Webster is the only one who believes that. No doubt there are some cases reported where the ovum is buried under the peritoneal surface, — that is thoroughly established. In my opinion the ovum can establish itself anywhere independent of the Mullerian tissue.

DR. BACON: The vaginal tissue, for instance.

DR. SCHMAUCH (in closing): Not on the vagina, because it is covered with squamous epithelium and communicates with the open air, but in the abdominal cavity.

In regard to Dr. De Lee's question, I will say that I have myself examined some membranes formed of hematocele and it is very difficult to decide what kinds of cells they are, but I am inclined to join in the opinion given lately by Macunet, that these cells are probably derived from the tubal wall. They are fibroblasts that are forced out of the continuity of the tube by pressure developed inside of the blood coagulum. Most cases of hematocele are brought on by tubal abortion and small masses of connective tissue of the mucous membrane which bulge out might afterwards get in connection with the peritoneal surface. The irritation of the fetal cells upon maternal tissue has some influence also. No doubt the blood coagulum, itself, brought into the abdomen is, as experiments show, not enough to produce such adhesions.

ABSTRACTS OF CURRENT LITERATURE

DEPARTMENT OF SURGERY

UNDER THE CHARGE OF

JOHN B. MURPHY, M. D. — E. WYLLYS ANDREWS, M. D.
FREDERIC A. BESLEY, M. D. — W. R. CUBBINS, M. D.

THE PARATHYROID GLANDULES. THEIR BLOOD SUPPLY, AND THEIR PRESERVATION IN OPERATION UPON THE THYROID GLAND. By William S. Halsted, M. D., and Herbert M. Evans, S. B.

Dr. Halsted is convinced from a long series of observations made on dogs in 1889 and 1906 and 1907, that if the blood supply of the thyroid or the parathyroid glands be cut off, the glands thus deprived of their circulation will probably die. More cases of operative tetany have occurred in the past two or three years than during the quarter century preceding. This is due primarily to the frequency in these years of operations for exophthalmic goiter and, perhaps, secondarily to the fact that surgeons have considered the non-removal of the parathyroids a guarantee that tetany would not supervene on operation. Dr. Halsted believes, however, that the parathyroid glands might, possibly, better be removed and transplanted into the vascular thyroid than, being deprived of their arterial supply, be left in situ in the neck, with the hope that vascularization and function would be restored. "It is in the control of hemorrhage that we sacrifice the parathyroid glandules. But the hemorrhage must be controlled and thyroid vessels must be divided somewhere in the operation for the removal of a lobe of the thyroid gland. May they be so divided and secured as not to cut off the blood supply of the parathyroid bodies?"

To decide this question Dr. Halsted enlisted the assistance of Mr. E. H. Evans, of the class of 1903 of the Medical School of the Johns Hopkins University, who contributes the findings in a series of unusually successful injections in man of the thyroid and parathyroid arteries. A tiny artery was found to supply the parathyroid glands in every instance. In ten individuals an inferior thyroid artery was observed nineteen times; a superior, twenty times or in every instance. Hence the absence in man of a parathyroid gland is a definite anomaly, and we may expect to find with great constacny four parathyroids in each individual. In six instances the inferior parathyroid gland was below the lower pole of the thyroid.

The location of the parathyroid glandules in man is in general much lower than in dogs, the higher of the two glands of one side being on an average about at the level of the junction of the upper and middle thirds of the thyroid lateral lobe. The lower of the two glandules is rarely as high as the middle of the thyroid lobe. With great regularity these little epithelial bodies were found about the posterior border of the thyroid lateral lobe and more or less in line with a vessel which Mr. Evans describes as a "channel of anastomosis" between the superior and inferior thyroid arteries.

Dr. Halsted writes that it is only with the exercise of the greatest caution that the parathyroid arteries can be spared in the operation of thyroid lobectomy, for "between the point at which the branch giving off the parathyroid artery enters the thyroid lobe and the origin of the latter vessel there may be barely room for one fine-pointed artery forceps and not space for a broader-nosed clamp, and still less for two clamps." On two occasions there was not room for even the fine point of a "mosquito clamp," and hence Dr. Halsted in one case deliberately ligated the inferior parathyroid artery and transplanted the parathyroid gland, seeing no alternative save preserving a portion too considerable of the thyroid lobe. On several occasions in the human subject, and frequently in dogs, Dr. Halsted has transplanted parathyroid glandules into the thyroid gland.

The operation advised by Dr. Halsted for the preservation of the parathyroids is that of ultraligation or ligation beyond the origin of the parathyroid arteries. A detailed description of this operation is given in the paper. If this view is correct, operations which aim merely to leave the parathyroid glandules in situ and take no heed of the parathyroid arteries will frequently, if not usually, cut off the blood supply of the parathyroid bodies and thus presumably effect their destruction.—*Annals of Surgery*, October, 1907.

THE DISPOSITION OF THE APPENDICEAL STUMP. Illustrated. By Benjamin Merrill Ricketts, Ph. B., M. D., LL. D., Cincinnati. Read before the Mississippi Valley Medical Association, Columbus, O., October 8–10, 1907.

This subject is dealt with from two viewpoints.

First — The consideration of the various methods of disposing of the stump.

Second — The cause of hemorrhage and its frequency. In response to circular letters sent to a number of surgeons, sixty-four replies were received representing 80,251 appendectomies with an average mortality of seven and one-half in acute and one and three-quarters per cent in chronic cases.

Eighty per cent of the total number of operations reported have been done by the four purse-string methods. The acute and chronic cases were about equal in number.

The various per cents of different techniques used is given. Also the per cent of cases in which the different ligatures and sutures of catgut and linen were used.

About sixty cases of hemorrhages from the stump are mentioned, forty of which are tabulated in detail, giving eleven deaths. Of the total number of hemorrhages mentioned, all but one have resulted in the purse-string methods. The technique of each of the sixty-four surgeons reporting is given briefly.

Investigation of this subject shows that many operators have abandoned the purse-string methods; that others are doing so; that simple ligature for the firm and extirpation for the soft appendix are the safer methods, and that any other than simple ligature and extirpation with linen or silk for ligature or suture should be condemned absolutely.

There are five illustrations showing the vascular supply to the cecum appendix and mesocolon, and thirteen giving the various forms of technique.

B. M. RICKETTS.

WOUNDS OF THE INTESTINE AND MESENTERY BY BLUNT FORCE. By Dr. Josef Hertle, from the Surgical Clinic in Graz. Prof. W. Hacker, Director.

Hertle quotes 154 cases, of which 9 came under his personal observation.

Etiology.

I. Circumscribed point of contact. 92 cases.

1. Of 140 cases, 41 (or 29%) were caused by kicks of horses.

2. Blows or crushing by wagon-poles were a relatively frequent cause.

3. Two cases were caused by boards springing away from circular saws.

4. Five cases followed blows from falling boards.

5. Falls upon pointed objects in 5 cases.

II. Broad point of contact. 34 cases.

1. In 11 of the 140 cases the cause was a "run-over" accident.

2. Crushing force — as between the buffers of railway coaches, a wall and an elevator, etc. 10 cases.

3. Falls. 14 cases.

Predisposing Factors.

1. Occupation: laborers, 32; factory workers, 20; farmers, 7; soldiers, 3; other trades, 9.

2. Sex: men, 124; women, 4.

3. Age: only 4 cases of children are noted.

4. Anatomic conditions:

a. Weak and loose walls, as in old people.

b. Pathologic fixation of portions of the intestine following inflammatory processes.

c. Hernia increases the danger.

Pathology.

1. Localization (as noted in 123 cases):

Small intestine	31	
No more accurate location given.		
Duodenum	12	
Jejunum	29	
Ileum	40	
Total small intestine	112	= 92%
Cecum	2	
Colon ascendens	2	
Colon transversus	2	
Colon descendens	1	
Flexura sigmoidea	3	
Rectum	1	
Total large intestine	11	= 8%
Total	123	

2. Frequently occurs the entrance of intestinal contents into the retroperitoneal tissue and subsequent phlegmons. These may extend along the spine into the pelvis or into the perirenal tissues.

3. Hematoma of the mesentery or retroperitoneal tissues frequently occur.

4. Gangrene of portions of the intestine as result of crushing or tearing from mesentery.

5. Suppurative peritonitis.

The Intestinal Wounds:

1. May be very small perforating wounds, "pea or millet size."

2. Larger wounds extending up to a complete separation of the lumen. The larger wounds are the more common.

3. The free border of the intestine more commonly suffers than the mesenteric border.

4. Frequently portions of mucosa are forced out of the wound far enough to come in contact with the peritoneum. This, together with muscular contraction, seems to be an attempt at closure.

Multiple Wounds (20 cases of 134).

1. Most frequently are found two near together, both rather small, or one a little larger than the other.

2. In 2 cases, 3 perforations were found.

3. In some cases the perforations lie at a distance from each other.

4. In one case one rupture occurred in a hernia, the other in the free abdominal cavity, but were only 7-8 cm. apart.

Symptoms.

I. General.

1. Shock, of greater or less degree. In a few cases has been so severe as to cause immediate death.

2. Pulse. Is often slow during shock period, due to vagus irritation. May be of normal rate. In 2 reported cases was rapid (108-128). After recovery from shock, may be practically normal until peritonitis begins.

3. Respiration — superficial and rapid. Abdominal breathing usually stops.

4. Temperature — relatively unimportant.

II. Local.

1. Free gas in abdomen. Most marked in stomach rupture.

2. Appearance of abdominal dullness, meaning hemorrhage or escape of intestinal contents.

3. Spontaneous pain, usually immediately after the injury, and almost always present.

4. Tenderness to pressure, diffuse or circumscribed. Usually present (of 136 cases absent in only 1).

5. Vomiting, especially when repeated and continuing over several hours.

6. Board-like contraction of abdominal wall. May be absent in severe shock.

7. Pain upon urination — occasionally.

8. Failure to pass feces or gas—frequent.

Diagnosis.

Exploratory laparotomy. Injection of air or water per anum and observation of abdominal changes subsequently is condemned.

Prognosis.

1. Of 106 cases operated, 29 recovered = 27.3%.

2. As to time of operation — it is noted that of the cases operated inside of 12 hours almost 50% were saved. In the second 12 hours only 20% were saved.

Treatment.

Operation as soon as possible.

1. Narcosis. Ether is better borne, as the cardiac force has already suffered from the peritonitis.

2. Treatment of intestinal wound.

a. Usually a two-row suture is found to be best. (In 61 cases 19 recovered. In no case did the stitches give way, so far as autopsies showed.)

b. When a very large rupture or transverse separation of gut occurs, resection must be done. (Of 17 cases 6 recovered.) In 8 cases the suture was employed, in 7 the Murphy button. In 2 cases a lateral anastomosis was made.

c. In 6 cases the ruptured portion was stitched into the abdominal wound. In 2 cases merely an abdominal tamponadè was done. These cases were in very bad condition when operated.

3. When peritonitis and paralytic ileus are already present, an enterostomy is recommended.

4. Washing out with NaCe solution is recommended when the cavity is much soiled.— *Ueber stumpfe Verletzungen des Darmes und des Mesenteriums. Beiträge zur klinischen Chirurgie*, vol. 53.

W. C. DANFORTH.

TETANY PARATHYREOPRIVA. A Case Report with a Brief Discussion of the Disease and of the Parathyroid Glands. By Eugene H. Pool, M. D. New York.

The description of a case of post-operative tetany which occurred on the author's service at the French Hospital, New York, is supplemented by a study of the disease and of the parathyroid glandules.

The author reviews the history of the subject, in order to call attention to the long series of animal experiments and to the significant findings of Pineles and Erdheim in man, which have led to the belief among most observers that tetany following goiter operations is the direct result of the absence of parathyroid function.

Considerations Concerning the Parathyroid Glands. In the author's dissections, 2.9 glands per person were found. Although the position varies greatly, the glands are usually situated on or near the posterior borders of the thyroid lobes. The occurrence in pairs may porperly be considered the typical arrangement, a superior and inferior body being present on each side. The average size of the organ is about 6 by 4 by 2 mm.; the shape, variable; the color, brown-red or reddish yellow.

The organ consists of a mass of cells invested with a thin fibrous capsule. Three varieties of cells can be recognized:

1. "Principal cells," many of which seemingly consist only of nucleus and cell membrane, but some of which present an irregular, stained peripheral zone and a clear cytoplasm immediately around the nucleus. The variations in the relative width of the clear and the stained zones suggest that under certain conditions the cytoplasm

of the clear cells takes on a stain which acts first near the periphery and then progressively toward the nucleus until the whole cell body may be stained.

2. "Oxyphile cells," which have a relatively large, finely granular body.

3. Small granular cells which are not characteristic.

In some glands gradations may be traced from the clear "principal" cells through the granular cells of the same type to the small granular cells of type 3, and also from the latter to the large granular cells of type 2, when these occur singly or in small groups. Following the analogy of the salivary and other glands, the question naturally suggests itself as to whether the granular cells are not the functionating and the clear cells the resting condition.

The parathyroids or epithelial bodies are branchial cleft derivatives. They develop from the third and fourth branchial clefts of each side. On the basis of our present knowledge the relation of these bodies to the thyroid must be regarded as purely topographical.

The chief function of the parathyroid seems to be to prevent the action of certain toxic substances regularly present in the circulation.

Attempts to ascribe the etiology of all forms of tetany and even of certain allied diseases, as paralysis agitans, to an imperfect functional activity of the parathyroid glands, have not yet been successful.

Considerations Concerning Tetany. According to v. Frankl-Hochwart, whose descriptions of the disease the author follows, tetany parathyreopriva is characterized by certain very striking symptoms which render it practically unmistakable. The most conspicuous of these are intermittent tonic spasms of the voluntary muscles, those of the extremities being most affected. A salient feature is the exclusive involvement of the flexor group of muscles.

With the view of solving the therapeutic possibilities of parathyroid transplantations, animal experiments were made in an effort to determine the following points:

1. Can the parathyroid live if transplanted, first, between animals of different species; second, between animals of the same species?

2. If it lives, does it functionate; and, if so, is the function permanent?

In the author's experiments upon rabbits and dogs, tetany was obtained quite constantly by parathyroidectomy and thyro-parathyroidectomy. Moreover, the previous implantation of parathyroids into the spleen of these animals did not seem to affect the course of the disease.

In conclusion, Dr. Pool states that it has apparently been proved that the removal of all, and possibly even of a part, of the parathyroid bodies, results in tetany; that the symptoms of this disease are striking; that the diagnosis is usually simple; and, finally, that efforts directed towards cure have not as yet been proved to be successful. Considering the uncertain status of all therapeutic measures, the importance of prophylaxis is evident. The operator must attempt to leave at least two of these bodies in situ with blood supplies unimpaired. Considering the difficulty of locating the parathyroid at autopsy, it is evident that in an operation their recognition would prove a matter of chance. Therefore, in order to preserve sufficient of the parathyroid tissue, it is necessary to leave the posterior part of at least one lobe of the thyroid, in connection with which two of these bodies usually lie. Moreover, the thyroid vessels, especially the inferior on this side, should not be ligated. The practice of leaving the isthmus only is obviously a very dangerous procedure. In addition, if the other lobe is completely removed, the dissection should be carried as close as possible to the true capsule of the organ, and independent small bits of tissue should be sought for posteriorly, stripped from the thyroid and left uninjured. Moreover, in ligating the inferior thyroid artery on this side, care should be taken to avoid including in a ligature or clamp the inferior parathyroid which frequently lies in close relation to this vessel.—*Annals of Surgery*, October, 1907.

A Contribution to the Surgical Study of Tumors of the Head of the Pancreas. By Dr. Mauclaire, Prof. Agrégé á la Faculté de Médecine de Paris, Chirurgien de l'hôpital Dubois.

The partial pancreatectomy reported is one in a man of sixty-two years of age, who had suffered from epigastric pains associated with icterus for several months. The diagnosis lay between a neoplasm of the head of the pancreas or a calculus of the common duct. The laparotomy showed it to be a tumor of the head of the pancreas, of the size of a large plum. It was removed without serious hemorrhage. The histological diagnosis was that of epithelioma of the pancreas.

A small quantity of bile discharged through the wound for eight days. There was some discharge also through the cholocystostomy wnich had been made. The patient grew weaker and died at the end of two months.

Six cases of partial pancreatectomy for cancer have already been published. The operation is difficult on account of the intestinal and vascular

dangers, also a complete ablation of the tumor is impossible.

At the site of the head of the pancreas one finds epithelioma, sarcoma, cysts and, exceptionally, the chronicle pancreatitis and tuberculosis. The diagnosis of a tumor can be made by an examination of the feces, but the diagnosis of the nature of the tumor is possible only after surgical intervention. One often finds in this region pancreatic tumors which have developed on the relics of a Wolffian body.

Partial pancreatectomy of the head of the pancreas has already been performed four times for cancer, once for sarcoma, eighteen times for benign tumors, sixteen times for cysts, once for fibroadenoma, once for tuberculous lymph-adenoma. Numerous cases of partial secondary pancreatectomy in the course of operation upon tumors in the neighborhood of the pylorus or colon are on record. The total ablation of the pancreatic head must be associated with partial or complete duodenal resection, and consequently associated operations are necessary, such as transplantation of the common duct and the duct of Wirsung into the duodenum or jejunum associated with gastro-jejunostomy; the palliative operations of cholecystostomy, cholecyst-gastrostomy or cholecyst-enterostomy give very little results. (Contribution à l' étude chirurgicale des tumeurs de la tête du pancréas.)—*Archives générales de Chirurgie*, July, 1907. Author's Abstract.

ARE THE INTESTINES ABLE TO PROPEL THEIR CONTENTS IN AN ANTIPERISTALTIC DIRECTION? By Edwin Beer and Carl Eggers.

The above question has been answered both affirmatively and negatively. Only recently Wilms, in his exhaustive review of the literature of this subject, arrived at the negative conclusion. The experimental work of the writers and clinical observations point to an affirmative reply.

The experimental method has failed in the past, because the data that were collected proved inadequate and inconclusive. Our more extensive study, we trust, will harmonize many of the apparently widely divergent views and results found in the literature.

1. If segments of the small or large bowel be reversed and the continuity of the bowel be reestablished, subsequent exposure and study of the behavior of the reversed segment will demonstrate whether this segment of the bowel is capable of acting in the reversed direction — i. e., capable of propelling its contents in an antiperistaltic direction. In four such experiments it was demonstrated at subsequent laparotomies that the direction of the peristaltic wave is reversed in the reversed loop, that it has become isoperistaltic with the bowel above and below the anastomoses. At first the waves run irregularly orad or rectad, but later the downward (antiperistaltic with reference to their original direction) waves predominate.

2. If extensive segments of the bowel are reversed and the animals have daily defecations, one must infer that the intestinal contents have been moved downward by antiperistalsis, as no other adequate force is conceivable. As another series of our experiments did not materially affect the regularity of the animals' defecations, they also point to the power of the bowel to propel its contents in an antiperistaltic direction.

3. Cannon and Murphy's recent observation of the behavior of experimental ileus cases (X-ray studies) in which the contents proceeded regularly as far as the obstruction and then moved backward (orad), also point to a similar antiperistaltic activity.

4. Last of all such well authenticated clinical observations, as the vomitory of stained enemata shortly after introduction into a normal intestinal canal, can be explained by active antiperistalsis alone.

IODINE AND THE PARATHYROID. By W. L. Estes, Jr., and A. B. Cecil.

The possibility of an iodine containing compound being present in the parathyroid gland was first suggested by Gley who found in rabbit and dog parathyroids more iodine relatively than in their thyroids. Upon this he built his theory of a "Thyroid System of Organs," correlating the thyroid and parathyroid in function, believing that the parathyroids prepare the product of secretion which is then transferred to the thyroid, the reservoir that supplies the demands of the organism for iodine. Jeandelize later concurred in this opinion, adding further that Gley's hypothesis agrees with the physiological effects of extirpating the parathyroid. Chenu and Morel more recently have determined in chickens, dogs, and rabbits that the parathyroid contains one-fourth as much iodine as the thyroid, and believe the active principle of the parathyroid is not an iodine containing compound.

We have analyzed — using Baumann's method, that of our predecessor's — the parathyroids of dogs, cows, horses, sheep, and man; taking from 25–100 glands for each determination. Out of 17 analyses but 4 gave any indication of iodine and but one an appreciable and estimable amount; great care was taken to control the accuracy of our technique.

We conclude, therefore,

1. That iodine as a constituent of the parathyroid may, generally speaking, be neglected.

2. That, if present at all in the parathyroid, iodine occurs in such minute quantities as to be of no functional significance.

3. We fail to find chemical grounds for the Thyroid System of Organs, proposed by Gley.— *Bulletin of the Johns Hopkins Hospital*, September, 1907. Author's Abstract.

THE PARATHYROIDS OF THE HORSE. By W. L. Estes, Jr., and A. B. Cecil.

Sandstrom first described the parathyroid of the horse as situated at the superior pole of the thyroid; Moussu found it in the perithyroid tissue along the thyroid artery; Verdun believed it was separated from the thyroid only by its capsule; Jeandelize asserted the variability of its position and further believed there is another parathyroid in the horse hitherto undescribed, either within the thyroid or somewhere in the surrounding areolar tissue. Rogers and Ferguson more recently have found a parathyroid external to the thyroid, along its posterior border, which they distinguish with difficulty from neighboring thyroid and lymphatic glands, and a parathyroid within the thyroid near its middle.

We reviewed the anatomy of the parathyroids of the horse and found an external gland, easily detected, having a peculiar, typical, granular appearance, situated in general near the superior pole of the thyroid, but invariably associated with the thyroid artery. Its histology agreed closely with the human parathyroid; its connective-tissue strands somewhat thicker and the alveolar lumina obliterated. Fifteen per cent of these glands were found to be cystic; i. e., a large cyst enclosed in the capsule of the parathyroid. A parathyroid was also found within the thyroid, distinguished by its paleness of color and thus easily confused with adenomata which are of frequent occurrence. It is usually separated from the surrounding thyroid tissue by a thin strand of connective tissue, but occasionally shades off gradually into thyroid. Its position within the thyroid is most irregular, often just beneath the capsule or embedded at the superior or inferior pole.

The horse, therefore, has four parathyroids, two on each side; one external to, the other within the thyroid; and thus resembles the other herbivora in the distribution of its parathyroids.— *Bulletin of the Johns Hopkins Hospital.* Author's Abstract.

TESTICULAR TENDERNESS AND NEPHROLITHIASIS. By A. Bittorf.

It is a well-known fact that the pain occasioned by stone in the kidney not infrequently radiates down the groin into the testicle. It is not so generally known that the testicle of the affected side is exquisitely sensitive in an attack of renal colic due to stones. Bittorf reports several personal observations of his own and shows the importance of the symptom as an aid in differentiating kidney stone from conditions simulating it. In women, pressure on the ovary of the affected side discloses the same marked tenderness (due to irritation of the spermatic plexus) as does pressure on the testicle in the male. In painful kidney conditions other than stones, for example, tumor of the kidney or nephritis, tenderness of the testicle is not present. As the symptoms of colic disappear, the testicle or ovary gradually lose their irritability, but they remain sensitive just as long as there is the slightest trace of pain referable to the kidney itself.— *München, Med. Wchnschr.*, No. 23, 1907. M. G. SEELIG, M. D.

THE CAUSES OF THYMUS DEATH. By G. Hotz.

This report of Hotz is based upon a study of the literature, upon personal clinical experience, and upon a pathological-anatomical study. The conclusions reached by the author are:

An hypertrophied thymus gland interferes mechanically with the organs situated in the upper intrathoracic space, this interference being favored by the anatomic conditions present in the thorax of the small child.

Autopsy reports show that an enlarged thymus exerts pressure upon the trachea so as to cause symptoms of tracheal stenosis, and to leave behind distinct evidences of this stenosis. Less often there are signs of pressure having been exerted upon the heart and large vessels.

Direct pressure upon the large nerves has never been demonstrated. But in cases where autopsy has failed to reveal any cause for death, it has been assumed that death was due to pressure on the important nerves in the upper mediastinum, or to a reflex disturbance of the respiratory center in the medulla.

The operative therapy of removing the enlarged thymus has, so far, always been followed by favorable results. Removal of the gland, resection of a part of it, or ectopexy of the gland accomplish favorable results merely by doing away with the pressure that is causing a fatal dyspnea.— *Arch. f. klin. Chir.* b. lx, h. 2. M. G. SEELIG, M. D.

A SYMPOSIUM UPON SURGERY OF THE STOMACH

PREPARED BY AIMÉ PAUL HEINECK

From the Archives Générales de Chirurgie, October, 1907

THE SURGERY OF GASTRIC ULCER. By Charles Gauthier.

A. GASTRO-ENTEROSTOMY FOR GASTRIC ULCER

1. ITS ADVANTAGES

It is a simple operation the steps of which are now well determined, the mortality of which is low. In 1905, Mayo Robson reported a mortality of 3.7 per cent in 186 cases. Jaboulay had 12 operations and no operative deaths. Whatever be the location, whatever be the clinical type of the ulcer, in the majority of cases good results immediately follow the performance of gastro-enterostomy. It rests the organs. It facilitates the evacuation of the stomach contents. Under these influences, the hyperacidity of the gastric juice diminishes. All these conditions contribute to cicatrization of the ulcer.

2. ITS DISADVANTAGES

A. *Persistence of recurrence of pain.* Some patients are only incompletely relieved; in others an improvement, followed by recurrence, occurs. In most of these cases we are dealing with ulcers adherent to the abdominal wall, to the liver, to the gall-bladder, or with ulcers that have perforated the tunics of the stomach and that are surrounded by peritoneal callosities. In one of these cases a secondary resection of the ulcer was performed in addition to the previous gastro-enterostomy and a permanent cure was obtained.

B. *Recurrence of the hemorrhages.* Warnecke, in 1903, reported 398 cases in which this accident occurred in 15 cases, with 5 deaths.

C. *Perforation.* A few cases are reported. They have occurred chiefly in ulcers too extensive for resection.

D. *Cancerous degeneration of the ulcer.* Mayo Robson says that in 60 per cent of cases of cancer of the stomach a history of ulcer is obtainable. In 37 cases of cancer of the stomach, operated by Jaboulay, such a history was noted 10 times.

B. RESECTION OF THE ULCER

Resection of the ulcer, theoretically, is a radical cure of the lesion. It protects the patient from the complications which have been mentioned previously: recurrence of hemorrhage, persistence or recurrence of the pain, perforation, cancerous degeneration.

1. INCONVENIENCES

The operative mortality is larger than that of gastro-enterostomy, still the method is new and the operative technique is susceptible of improvement.

2. OPERATIVE DIFFICULTIES

In large ulcers, especially if they be adherent to the neighboring organs, resection is out of the question. Nevertheless many surgeons fear so much malignant degeneration of the ulcer that they practice resection even if they have to attack neighboring organs, such as the liver, pancreas, etc. Adhesions of the abdominal wall to the colon do not contraindicate excision.

In some cases we are not able to find the ulcer, hence we are compelled in these cases to be satisfied with the performance of gastro-enterostomy.

3. STENOSING ULCERS

If it be a callous ulcer of the pylorus, remove it. If it be a simple ulcer, perform gastroenterostomy.

4. ULCER WITH PERIGASTRITIS

If the adhesion of the abdominal wall to the colon or to the gall-bladder be not extensive, it is well to cut the adhesion and resect the underlying ulcer. If the ulcer be adherent to the pancreas or to the liver, the advisability of the excision is questionable. It is better to perform gastro-enterostomy in the majority of these cases. Gastro-enterostomy remains the operation of election for gastric ulcer complicated by extensive perigastric adhesions.

5. MULTIPLE ULCERS

Resection may be attempted if there be 2, 3, or 4 ulcers, but usually in these cases the adhesions of the stomach contraindicate resection. If the ulcer be adherent to the abdominal wall and a gastric fistula exists, only resection is capable of curing the patient. If the ulcer has perforated into the peritoneal cavity, resection followed by suture is the operation to perform.

Gastro-enterostomy may be followed by diminution, by disappearance of inflammatory masses surrounding the ulcer. This is an unusual occurrence, and we must not depend upon it. We must keep in mind the possible immediate or late cancerization of gastric ulcer. We should, whenever the operation is feasible, perform resection instead of gastro-enterostomy. — *Chirurgie de*

l'ulcère de l'estomac. Archives Générales de Chirurgie, October, 1907.

THE SURGERY OF BI-LOCULAR (HOUR-GLASS) STOMACH. By A. Montprofit.

Hour-glass stomach is of different varieties. 184 cases, operatively treated, have already been reported. The functional disturbances to which it gives rise can easily be reasoned out. The same operative procedure is not applicable to all the different varieties.

Gastro-anastomosis and simple gastroplasty are the least serious operations performed for this malady. Recurrence, not infrequently, attends their performance. Their performance is indicated when the constriction occupies the central portion of the stomach. When the pylorus is normal and when there is not an ulcer complicating the condition (Mayo Robson), these two operations have a field.

Gastro-enterostomy is preferred by some surgeons (Von Eiselsberg, Guillemot, Montprofit).

The anastomosis must be made with the cardiac pouch, not with the pyloric pouch. It is always indicated if pyloric stenosis coexists. The gastro-jejunostomy may be anterior, ante-colic, may be posterior, retro-colic, may be the so-called Y gastro-enterostomy, may be associated with entero-anastomosis.

Gastro-duodenostomy was performed three times. Extirpation of the constricted portion also has its advocates. Its operative mortality is still high (12 per cent).

If the patient's condition is such that he cannot stand a long operation, as a provisional step resort can be had to jejunostomy. (Mayo Robson.)

Atypical and complicated operations are at times required owing to unusual malformations, such as tri-locular stomach, etc.—*Chirurgie de l' estomac bi-loculatre. Archives Générales de Chirurgie*, October, 1907.

SURGICAL INTERVENTION IN NON-PERFORATING ULCER OF THE STOMACH. By Charles Gaudemet.

Charles Gaudemet states the following conclusions as well-based:

1. Only such gastric ulcers as are not benefited by medical means demand surgical aid.

2. Operation is indicated:

a. In the presence of pain due to a spreading ulcer, to a perigastritis, to a stenosis, be the stenosis spasmodic or cicatricial in nature.

b. In hemorrhages. Frequently recurring hemorrhages call for operation.

c. In stenoses. Stenosis is an imperative indication for operation. Early operations are the ones that give the largest number of operative and therapeutic successes.

Choice of operation. Of the two operations, resection or gastro-enterostomy, the former has the highest immediate mortality.

Resection has the theoretical advantage of protecting from immediate dangers, such as hemorrhage, of protecting from late dangers, such as cancerous degeneration of the ulcer. It has the following shortcomings: It is not applicable to cases of multiple ulcers. One is liable to be satisfied with the excision of an ulcer and thereby to overlook the other ulcers. It removes the existing ulcer, but does not remove the cause of the ulcer; the patient thus remains exposed to the danger of recurrence. It is at times difficult of execution, and after suturing of the defect not uncommonly an odd-shaped stomach, unable to functionate normally, remains. It is permissible in certain ulcers of the anterior wall. It is not to be performed in most ulcers of the posterior wall, nor in those of the lesser curvature. If gastro-enterostomy has failed to mitigate or cure the symptoms, resection can be tried.

Pylorectomy, when not difficult of execution, may be performed in ulcers of the pyloric portion of the stomach. It must be performed, if malignant degeneration of the ulcer is feared. It must be completed by a gastro-enterostomy. The method to be employed is Billroth's second method. Perform an antero-gastro-enterostomy, then resect as much of the stomach and duodenum as may be necessary, closing each opening blindly.

Gastro-enterostomy is the operation of election. It can be performed with ease and with rapidity. Its comparative simplicity commends it. It is suited to all cases, because it affords rest to the stomach, and also because it always can be performed in healthy tissue. The author recommends that preference be given to posterior gastro-enterostomy and that the anastomotic opening be large and dependent. Select that operation which is least likely to be followed by a vicious circle.—*De l'intervention chirurgicale dans l'ulcère non perforé de l'estomac. Archives Générales de Chirurgie*, October, 1907.

TUBERCULOSIS OF THE PYLORUS AND TUBERCULOUS STENOSIS OF THE PYLORUS. By Ricard and Chevrier.

This is an uncommon affection. It is characterized by a somewhat elastic enduration located in the pyloric region. This enduration, unlike that of cancer, involves the duodenum for several centimeters. There is most always an extensive ulcer which tends to invade the entire circumference of the pylorus. The submucosa is much infiltrated. The edges of the ulcer are undermined. The tubercles develop in the margins and

in the base of the ulcer, hence the possibility of fistulæ.

In some cases, the tubercle bacilli have been detected. The regional lymphatic glands are often involved, they may be caseous, their enlargement may be considerable. The involvement of the retro-pyloric group may by compressing the pylorus cause symptoms of stenosis. It occurs with equal frequency in both sexes. Its maximum frequency is between the ages of twenty and thirty. The condition may be primary; it may be secondary to tuberculosis existing in another portion of the body. It is not always easy to determine how the causative germ has entered the organism, how it has reached the pyloric region. Tuberculosis and tuberculous stenosis of the pylorus may be secondary to a tuberculous ulceration of another part of the stomach. It may be of slow, it may be of rapid onset, and there may be remissions. The remissions may be due to an ulceration or to the formation of a pyloroduodenal fistula.

Tuberculosis may extend to other organs. As complications may be mentioned the accidents of ulcers, profuse hematemesis, perforation giving rise either to localized or generalized peritonitis. The prognosis is bad, owing to the rapid course, owing to the extension of tuberculous lesions to neighboring or to distant organs.

Owing to the fact that the peripyloric lesions are frequently extensive, owing to the fact that tuberculous disease of other viscera frequently co-exists, the resection of the tuberculous focus is dangerous and is not to be attempted. In most cases, palliative treatment is the one to be employed. This palliative treatment is not the section of the tuberculous bands, is not jejunostomy nor pyloroplasty. This latter operation is much in vogue in Italy. Gastro-enterostomy is the operation which we prefer. Operative results are not very satisfactory. In 7 cases only one cure was obtained.— *De la tuberculoses et les sténoses tuberculeuses du pylore. Archives Générales de Chirurgie*, October, 1907.

Cancer of the Antrum Pylori. By Leriche and Delore.

The antrum pylori is a prominence of the great curvature in the distended stomach, situated a short distance from the pylorus.

This is not an unusual seat for cancer. Carcinoma is more frequent in this location than the text-books would lead us to think. It is usually diagnosed only when it has involved the pyloric region and begins to be occlusive, that is, at the time it has obliterated partially the pylorus. Early gastrectomies for cancer of the stomach have revealed to us the frequencey of occurrence of cancer of the antrum pylori. In its early stages the first symptoms are dyspeptic, in its later stages the symptoms are those of stenosis. These tumors, owing to their juxta-pyloric site, are occlusive only at a late stage, only at the time that the tumor by progressive extension and invasion of the pylorus obliterates the latter. Hence, vomiting is a late symptom. These tumors in their early stage can easily be removed. Owing to the mobility of the antrum pylori, these tumors do not frequently contract adhesions. In them are found the best anatomical conditions for a large resection. In an individual not weakened by a long period of vomiting, in an individual whose general condition is not much impaired, the operative results are good. We report 8 cases. In 7 a pylorectomy was performed. There was only one operative death. Two of the patients are still alive; one four years and the other twenty-one months after the operation.—*Du cancer de l'antre pylorique. Archives Générales de Chirurgie*, October, 1907.

Gastro-cutaneous Fistulæ Secondary to Ulcers of the Stomach. By R. Leriche and Patel.— *Revue de Chirurgie*, 1906.

a. These fistulæ are relatively rare. They usually follow the spontaneous or the surgical opening of a perigastric suppurative focus. In other cases they are due to a stomach, the seat of ulcer, becoming so firmly adherent to the anterior abdominal wall, that the ulcer extends into the muscular planes and penetrates the whole thickness of the abdominal wall. When following surgical intervention, the abscess may or may not have been diagnosed previous to operation. The seat of election of these fistulæ is the upper portion of the stomach. This portion is not endowed with much mobility and can easily adhere to the abdominal wall.

b. Once established, the symptoms vary with the seat of the fistula. If it be high, that is, juxta-cardiac, the discharge is intermittent; if it be low, that is, juxta-pyloric, the discharge is constant. In the former, the general condition of the patient remains good; in the latter, decline easily sets in.

c. The treatment must consist of resection of the ulcer and of the affected portion of the abdominal wall, closure of the stomach by suture, and, finally, suture of the gap in the abdominal wall. This is a curative operation; gastro-enterostomy is only a palliative operation in these cases. A gap in the stomach which can not be closed by suture may be stopped by omentum or tamponed with gauze. *Les fistules gastro-cutanées consécutive à l'ulcère de l'estomac. Archives Générales de Chirurgie*, October, 1907.

INDICATIONS AND OPERATIVE RESULTS IN CANCER OF THE STOMACH. By Vincenent.

Diagnosis in these cases may be probable, may be positive. Usually the surgeon operates because of the presence of symptoms of pyloric stenosis. Symptoms of pyloric stenosis are ample justification for an exploratory operation. In these cases we begin with an exploratory laparotomy, and once having gained access to the abdominal cavity, we determine the nature of the operative treatment, which in some cases will be palliative, in others curative; gastro-enterostomy or gastrectomy. For instance, in 10 cases where the palpable tumor appeared mobile, in only 3 could extirpation be attempted, and in only 1 case did cure maintain itself without recurrence for over three years.

In cancerous stenosis of the pylorus gastro-enterostomy, though only a symptomatic treatment, gives a most favorable immediate prognosis; 11 cases out of 12 were successes. Its results are remarkable. The nutrition of the patient is improved, and appearances of perfect health can be restored for a period which may exceed a year. This improvement is noted even in those cases where the surgeon at the time of the operation has determined the presence of metastatic foci in the mesenteric glands. The removal of the tumor prolongs life, and gastrectomy, although it has a high operative mortality, remains in suitable cases the operation of election.

The histological variety of the tumor determines the frequency of recurrence. Some forms of cancer rapidly infiltrate all the tunics of the stomach walls, early involve the peritoneum and the neighboring organs. This type is not a favorable one for operation. The circumscribed tumors are those where the radical operation of resection finds its most successful indications. In some of these life can be much prolonged. The prolongation may be so marked as to lead one to consider the case as a true cure.— *Les indications et les résultats operatoires dans le cancer de l'estomac. Archives Générales de Chirurgie*, October, 1907.

GASTRECTOMY AND LATER RESULTS OF RESECTION IN CANCER OF THE STOMACH. By R. Leriche.

This article is based upon the study of 1366 reported cases. Mode of local and of lymphatic extension of cancer of the stomach. The technique of gastrectomy must be based upon our knowledge of the paths of extension. It is now established that in making a large resection we can often prevent recurrence. Cancer propagates itself chiefly through the submucosa, always the histological zone of infiltration in this layer is more advanced than elsewhere. It is an operative necessity to go beyond this zone, but by direct examination the limits of this zone can not be determined. As a general rule it ceases three or four centimeters beyond the point where the gastric tissue appears macroscopically healthy. It is there that you must cut. Each variety of cancer has peculiarities in its mode of local extension. Pyloric cancer is characterized by its tendency to spread along the lesser curvature. Even in small tumors the infiltration almost always goes as far as the cardia. The duodenum must always be looked upon with suspicion, because in 37 per cent of pyloric cancers it is histologically invaded.

Cancer extending chiefly by means of the lymphatic vessels, and this mode of extension being constant and early, the parastomatic lymph nodes are infected early. For each cancer the infection involves definite lymphatic gland groups. This involvement is irregular. For instance, in neighboring lymphatic glands of the same chain, contiguous to each other, some show neoplastic change, while others only show inflammatory change. It must not be assumed that every enlarged lymph-gland is carcinomatous. It is not surprising to find simple hyperplasia of some of the lymph-glands, as ulceration is of common occurrence in carcinoma. Naked eye examination does not enable us to determine the nature of the change. This lymphatic enlargement does not counterindicate an operation, but the entire chain must be extirpated.

Recurrence and later results. In the statistics at our disposal, two thirds of the patients that recover from the operation, resection of the tumor, ultimately die of cancer. Sixty-two per cent of these die of a local recurrence. In these cases, the resection has been made through the diseased tissues. Death due to metastatic cancers occurs in 25 per cent of these cases.

Billroth's Operation No. II. In our opinion it is the best operation to perform. This operation consists of resecting as much of the stomach and duodenum as may be necessary, closing each opening blindly. The operation is completed by performing an antecolic gastro-enterostomy. The authors have been able to collect 89 cases of cure lasting longer than three years, and 40 of these lasted longer than five years.

Operative mortality and complications. Mortality is still high, although it is declining. In 1239 cases the operative mortality was 25 per cent; nowadays the operative mortality is about 10 per cent and in favorable cases 5 per cent. The great cause of death is peritonitis, at times due to the operation, more commonly however to an insufficiency, to an incompetency of the sutures.

Many of the deaths are due to pulmonary complications, which nine times out of ten have their origin in the wound.

Among other causes of death may be mentioned shock, duodenal fistulæ, hemorrhage, etc. Most of these accidents can be avoided if the operation be very methodical and entirely aseptic.

Indications. All tumors of the stomach must be removed if they be extirpable and if the cachetic condition of the patient does not oppose the intervention. It must be removed not only on account of the accidents which it causes, but also because it is a cancer. It is so advantageous to perform early operations that as an absolute rule all individuals in whom cancer of the stomach is suspected and who are not benefited by a well-directed medical treatment, should be submitted to an exploratory laparotomy. The patients who do not vomit should be operated upon the same as those who do. They are frequently more operable because of the localization of the tumor (cancer of antrum pylori). To the ordinary exploratory laparotomy, followed by an exploration of the lesser peritoneal cavity, we add the mobilization of the duodenum. This renders the lesions more accessible. Once the resection has been decided upon, whatever be the type of operation, it must be performed with careful hemostasis.

Pylorogastric resection. Whatever may be the apparent limitation of the lesions, resection must include all the lesser curvature and the removal of the lymphatic nodes along this border. This resection must be extended as far as the cardia and must include at least three centimeters of the duodenum. The operation, very methodically performed, will include the following six steps:

1. Ligation of the coronary arteries and of the gastro-epiploical arteries. 2. Suture of the stomach and displacement of the tumor to the right. 3. Immediate closure of the cardiac stump. 4. Ligation of the gastro-duodenal and pyloric arteries. 5. Section of the duodenum and ablation of the tumor. 6. Re-establishment of the gastro-intestinal continuity.

For this type of operation Billroth's operation No. 2 is the operation of choice. It is anatomically, pathologically more logical, and technically easier to execute.

Total ablation of the stomach. Under this name must be included all those cases where the gastro-splenic region is to be removed. The author has collected 97 of these cases, with mortality of 39 per cent. The late results are very satisfactory. In sarcoma of the stomach wide resections are those less frequently attended by recurrence.—*Gastrectomies et résultats éloignés de la résection dans le cancer de l'estomac. Archives Générales de Chirurgie,* October, 1907.

A Contribution to the Study of Hemorrhagic Ulcer of the Stomach. By M. Leriche.

In the case of ulcer of the stomach, hemorrhage is the cause of death in 5 per cent of the cases; that is, in 20 cases of ulcer of the stomach one dies of hemorrhage.

In acute hemorrhages in ulcer of the stomach operation is not indicated. Medical treatment suffices in a great majority of cases. In chronic hemorrhages and in recurring acute hemorrhages gastro-enterostomy is the operation to perform, in all those cases where the ulcer is located in the pyloric region. The statistics do not yet tell us whether gastro-enterostomy is the treatment of choice in chronic ulcers which do not yield to medical treatment. This is one of the questions that the future must decide. Habershoun observed for ten consecutive years 60 patients who had ulcer of the stomach. Six of these patients died during acute spreading stage of the ulcer; that is, a few days or a few weeks after the onset of the accidents. Eighteen of the patients died in from one to twenty years after the onset of the ulcer. In almost all these cases, death was due to perforation or to hemorrhage. Thirty-six of these patients remained cured; that is, they remained ten years without symptoms referable to the gastric ulcer.—*Contribution a l'etude de l'ulcère hémorrhagique de l'estomac. Archives Générales de Chirurgie.* 1907.

Perforating Ulcers of the Lesser Curvature. By L. Pinatelle.

We have seen two perforating ulcers of the lesser curvature. Owing to the extent and the depth of the lesion, resection followed by direct suture was not feasible. The treatment adopted was isolation of the stomach from the rest of the abdominal cavity by gauze compresses. We have been able to collect 300 cases of operations for perforating ulcers of the stomach. Of these, 117 were found in this region. The majority of the ulcers occur in the region of the lesser curvature, but this is not the most frequent seat of perforation. Its high situation, its fixity, and especially the frequency of adhesion formation, often protect the general peritoneal cavity from affection and lead to the formation of perigastric abscesses. Clinically in these perforations we notice the persistency of vomiting. This is a symptom which usually is lacking in perforating ulcers of the greater curvature.

As soon as a perforation has occurred the patient must be laparotomized, and either direct suturing or, better still, an excision of the ulcer followed

by suturing must be performed. This operation, habitually, can be performed even if the ulcer involves the lesser curvature. Two conditions nevertheless may contraindicate it: peripheral adhesions, the friability of the margins and great size of the perforations. These adhesions, which we must always respect, at times render difficult and dangerous the seeking of the perforation; hence in certain cases we will abstain from this search and we will be satisfied with a protective walling-off. But if there be a free perforation with few or no adhesions, in some cases the extent and the friability of the margins of the perforation and the impossibility of performing a sufficiently large resection will prevent resection, and then we will have to use such methods as sutures à distance, suture of the ulcer to the skin, fixation of the omentum, which will frequently be combined with the walling-off.— *De la perforation des ulcères de la petite courbure. Archives Générales de Chirurgie*, October, 1907.

GASTROPEXY AND RETENTION. By E. Nyrop.

Gastropexy is indicated in gastroptosis, accompanied with symptoms referable to ptosis or to an angulation of the pylorus. If the retention be marked, and be attended by functional disturbances, gastro-enterostomy is indicated. This retention may be determined by an angulation of the pylorus, by cicatricial pyloric stenosis, by compression of the pylorus, etc.

Rovising believes that the existence of adhesions of the serous coat of the stomach to the anterior abdominal wall does not occasion pain, but the author, Nyrop, reports cases which contradict this information.— *Gastropexie et Retention. Annales de chirurgie gastro-intestinale*, April, 1907.

GASTROSTOMY IN CERTAIN FORMS OF PERITONITIS. By Gautier and Pinatelle.

Certain forms of acute peritonitis are accompanied by frequent vomiting. This vomiting has a tendency to evacuate the stomach, which is dilated by gas and grayish or greenish liquids, originating in the stomach and in the intestines. The stomach thus dilated can not completely evacuate itself. Satisfactory proof of this will be obtained by practising gastric lavage of the stomach after the patient has vomited several times. This lavage always brings back a fairly large quantity of fluid. Comparing gastric dilatation, which occurs in peritonitis, to retention of urine in the urinary bladder, the term vomiting by overflow has been coined.

Why is it that in certain forms of peritonitis we have dilatation of the stomach and repeated attacks of vomiting? Why is it that in other cases the stomach remains empty? May it not be that this gastric dilatation is due to a localization of the inflammatory processes, to the upper compartment of the abdomen? In fact, the latter is the explanation that has been given by some authors. The dilatation of the stomach in acute peritonitis is the cause of depression of the organism.

a. Visceral compressions. The gastric pouch, distended with gas and pathological liquids, pushes the diaphragm upward and compresses the heart. From this results dyspnea, cyanosis, and a tendendy to collapse. Below the stomach compresses the intestines and especially the transverse colon. Thus there follows a poor intestinal circulation which is already compromised by the paralytic ileus.

b. Dangers of vomiting. The pains and nausea incident to frequent vomiting exhaust the patient. They are potent factors in the production of shock They tend to diffuse the peritonitis. They prevent the taking of nourishment.

c. Intoxication. This greenish colored fluid contained in the stomach and which in part comes from the upper segments of the intestines is very toxic. The vomiting only evacuates one portion of it. A certain portion remains in the stomach to be absorbed and intoxicate the organism; hence it is indicated to empty the dilated stomach.

Lavage of the stomach has been done many times. It has given some successes, but it is depressing when it must be repeated, and in weakened, fragile patients its frequent repetition is exhausting. Evacuating gastrostomy with continuous drainage of the stomach contents is less collapsing than lavage. It is done once for all. With its completion disappear definitely dilatation of the stomach and all its inconveniences.

Its technique is very simple. After local anesthesia, a median incision is made and the juxtacardiac portion of the stomach is exposed. This portion of the stomach is fixed to the parietal peritoneum by a series of sutures approximating serosa to serosa. The stomach is incised in the center of the portion fixed to the abdominal wall, and a urethral catheter of large caliber is placed in the stomach. It is maintained in position by a suture passed through the skin. The contents of the stomach are evacuated by syphonage. The symptoms arising after gastrostomy are the following:

There is a continuous escape of gas and liquids, the quantity of which may reach three or four liters per day. In case of recovery the quantity of liquid drained diminishes. Its character changes, from being greenish at first it becomes yellowish, then, after the disappearance of bile, grayish.

It permits the immediate nourishment. Two or three hours after the evacuation of the stomach you can begin to inject milk, broth, and alimentary liquids through the catheter into the stomach. After the injection of nourishment, the catheter is then compressed for about 15 minutes. Some of the liquids injected return, some remain. The closure of the gastric fistula must be made when the temperature has fallen to normal, when the patient's general condition has improved, when the drained liquid has diminished in quantity and has lost its bilious character.

In one of the cases cured, closure was made on the sixth day; in the other on the tenth day. The method was applied five times. There were two cures and three deaths.— *De la gastrostomie dans certaines formes de péritonite. Archives Générales de Chirurgie*, October, 1907.

PERIGASTRITIS SECONDARY TO ULCER OF THE STOMACH. By Cavaillon and Delay.

Pathological Anatomy. In many cases, the peritoneum in the neighborbood of the ulcer becomes inflamed and leads to the formation of adhesions, easily separated at first, but which in time are organized into dense fibrous tissue. Often in the center of these adhesions are small suppurative foci. All stages may exist from miliary abscesses to extensive suppurative perigastritis. These latter may be secondary to a perforated ulcer and be situated in the midst of dense adhesions, which take the place in part of the destroyed gastric wall.

But you may have a suppurative gastritis secondary to a non-perforating ulcer, secondary to an ulcer which has thinned the stomach wall sufficiently so the bacteria can reach the peritoneal coat of the stomach. Perigastritis protects the general peritoneal cavity from infection. Ulcers of the anterior wall do not often give rise to perigastritis; hence they expose the patient far more to peritonitis.

When the ulcer has perforated into a mass of adhesions, the hyperacid gastric juice may digest these tissues of new-formation, and the ulceration may extend to neighboring organs: liver, pancreas, or to the skin (cutaneo-gastric fistulæ); but we want to emphasize this, that perigastritis is dependent upon the ulcer. If the ulcer heals, the perigastritis does not progress.

Topography of Perigastritis. There may be the formation of isolated bands. These isolated bands may compress the intestines, may obstruct the pylorus, may determine pseudo-bilocular stomach. There may be posterior adhesions. These posterior adhesions tend to cause a disappearance of the lesser peritoneal cavity and to create intimate gastro-pancreatic adhesions. There may be subhepatic adhesions. These are most frequent and correspond to the ulcers of the lesser curvature. In marked cases the gall-bladder, the pylorus, and the hilus of the liver form one mass, and thus are determined disturbances in the excretion of bile. If the ulcer is in the neighborhood of the cardia, the left lobe of the liver may fuse with the stomach.

Anterior adhesions. Not common. The ulcers of this region are more frequently followed by generalized peritonitis. When adhesions exist, they are usually to the left and above the umbilicus.

In some cases, the stomach as a whole is surrounded by a mass of adhesions and is adherent to all the neighboring organs. Suppurative perigastritis may occupy any of these different localizations, but in the vast majority of cases a subphrenic abscess forms. This subphrenic abscess occupies inter-hepatic space of Martinet. The superior ulcers usually cause encysted suppurative foci in the lesser peritoneal cavity. Perigastritis has not a very typical symptomatology. It is overshadowed clinically, just as it is determined from the standpoint of etiology, by the gastric ulcer. Medical treatment is futile. The causal lesion must be attacked. The simple laparotomy, the liberation of the adhesions must be supplemented by ablation of the ulcer, which is the operation of choice, or by gastro-enterostomy. In many cases it is well to associate both of these operations. The suppurative foci must be drained.— *Les périgastrites consécutives aux ulcères de l'estomac. Exposé de titres à l'agregation. Archives Générales de Chirurgie*, October, 1907.

ABSTRACTS OF CURRENT LITERATURE

DEPARTMENT OF OBSTETRICS

UNDER THE CHARGE OF

C. S. Bacon, M. D. Rudolph W. Holmes, M. D.
C. v. Bachellé M. D. Hugo Ehrenfest, M. D.

Eclampsia and Parathyroid Insufficiency. Based upon a series of experiments concerning the influence of the parathyroid secretion, V. Frommer came to the following conclusions: that the parathyroid glands which are structures of an epithelial character and very vascular, have an antitoxic function, the lack of which permits the development of tetany. Partial parathyroidectomy causes no especial physiologic disturbance in rabbits, but total extirpation may cause death. Complete excision of the thyroid and parathyroid glands caused a fatal tetany to follow. In case of a partial insufficiency, the implantation of the placenta caused marked physiologic disturbance due to metabolic products of a toxic nature.— *Experimentelle Versuche zur parathyroidalen Insuffizienz in Bezug auf Eklampsie und Tetanie. Monatsschrift für Geb. und Gynäk.*, bd. xxiv, heft 6.

C. v. Bachellé.

Hebosteotomy. By Dr. Hammerschlag.

Hammerschlag reports a case in which hebosteotomy was performed and which was followed by evil results. The patient was 36 years old and had given birth to thirteen children previously. Her diagonal conjugate measured 11.3 cm. After seventeen hours of good pains, the fetal head still remained above the brim of the pelvis, the lower uterine segment became tender and the cervix edematous. Under these conditions he did a hebotomy according to Bumm's method, in which the needle is entered between the large and small labia and, under guidance of a finger in the vagina, is carried behind the pubic bone and brought out near the median line. The bone was cut easily and the fragments separated to the extent of 2 cm. This was accompanied by a considerable hemorrhage out of the lower opening, which could not be controlled by tampon, but was checked by a suture. The patient then was encircled by an elastic bandage and the labor allowed to progress normally. A catheter evacuated some pale bloody urine from the bladder. Four hours after the section the child weighing 4600 gms. was born. A retention catheter was placed in the bladder and drained off bloody urine freely. Later it ceased to drain properly, and the patient developed a very severe sepsis of which she died forty hours post partum. The autopsy showed the tissues of the space of Retzius infiltrated with bloody fluid, and in the region of the upper border of the bone incision was an opening 3 cm. long in the anterior wall of the bladder.

Undoubtedly the injury to the bladder allowed the escape of urine, probably infected with streptococci, into the space of Retzius whence arose the severe septicemia. The bladder injury, which so frequently occurs when hebotomy is done by Bumm's method, is usually followed by good results when the retention catheter is used, and this made him believe that even in this case the result would have been different had the patency of the catheter been maintained.

He believes, however, that the Döderlein method is the better one to use since it affords more certain protection to the bladder, although, in his opinion, it is slightly more complicated in technic.

He would also regard the existence of a bladder lesion as an indication for immediate delivery, since by waiting for spontaneous birth, even though a retention catheter is in the bladder, the descending head may so interfere with the flow of urine through the tube that it may escape through the lesion into the surrounding tissues.— *Warnung vor poliklinischer Ausführung der Hebosteotomie. Zentralblatt für Gynäkologie*, No. 33, 1907.

C. v. Bachellé.

Interstitial Tubal Pregnancy. By A. Rieck.

This interesting condition occurred in a woman 28 years old, who had previously borne two children. About one month after her last menstrual period, she had a severe hemorrhage lasting eleven days, and for which she was curetted. In seventeen days she had a recurrence of the hemorrhage

which ceased after rest in bed. Upon examination a tumor, the size of an apple, was found to the left of and adherent to the uterus. In order to determine whether it was a myoma or fetal remnants, the uterine cavity was sounded. The instrument entered in the proper direction to a depth of 8 cm., and then without resistance it slipped to the left and anteriorly to the depth of 17 cm., and the woman went into collapse. She was brought to Rieck's clinic showing all the signs of internal hemorrhage. The abdominal section showed a uterus fixed in the depth of the pelvis by a tumor the size of an apple, located on the left side, and at the left corner was a projecting mass as large as a walnut. The latter had a hole in it from which the blood flowed. This small tumor was excised and its base closed. The ovary and tube, together with the lateral mass which proved to be an hematocele, were removed and the left broad ligament used to cover the raw surfaces and the defect in the uterine wall. The patient made good recovery and is free of symptoms, although the uterus is fixed posteriorly and drawn to the left side.

The specimen of the tube was split lengthwise along the canal and showed its cavity running for ¾ cm. through uterine substance, then through the fetal sac to the opening which bled so freely at the time of the operation. The fetal sac was surrounded in ⅔ of its surface by uterine substance which gradually became thinner until on the top it was covered apparently by peritoneum alone.

Rieck believed that the first hemorrhage the woman had was a spontaneous one from a slight perforation of the thinned area on the surface of the interstitial pregnancy and gave rise to the hematocele which involved the adnexæ and broad ligament of that side. The last and almost fatal hemorrhage was, of course, caused by the use of the sound which perforated the fetal sac and apparently emerged through the same opening from which the first bleeding came.

He condemns the promiscuous use of the sound because of such dangers and states that one can learn the same facts by a careful bimanual palpation.— *Ein Fall von interstitieller Tubenschwangerschaft. Perforation durch die Uterus-und Tubensondierung. Zentralblatt für Gynäkologie*, No. 35, 1907. C. v. Bachellé.

Pregnancy Following Atmokausis for Sterilization. By P. Meyer.

The report of this case is interesting, because atmokausis failed to produce sterilization, for which it was performed, and because atmokausis is proved to be a dangerous procedure where it is followed by pregnancy. Meyer's case is that of a woman thirty-six years old who had been pregnant twenty-two times. Only three pregnancies went to term, but the labors were spontaneous, the third being complicated by adherent placenta which required manual delivery. This was followed by a febrile condition for two months. Of the abortions only the last resulted in a febrile puerperium, after which curettage was performed. Epilepsy supervened after the last confinement. Sterilization by hot vapor was then attempted, but the patient continued to menstruate and became pregnant four months later. A sound was passed, but this failed to disturb the gestation, which continued accompanied with marked pelvic pain. At the fifth month severe hemorrhage occurred. Through a rigid cervix, dilated with difficulty, no part of the ovum could be palpated, but a short distance above the internal os a point of stenosis, resembling a spur, was found. Recesses on either side of this point gave the impression that the fundus of the uterus had been reached, so that a cornual gestation or a tumor of the posterior wall was thought of. Further examination, however, revealed a dilatation above this point of contracture in which the oval sac was found. This was ruptured, and after considerable difficulty a foot was brought down. Labor was thus induced, and the fetal head was delivered after perforation. The placenta was delivered manually, and it was now discovered that the gestation sac lay in a thinned-out chamber in the left portion of the uterine wall, while the right wall and the cavity took no part in accomodating the fetus. The author argues that, since the mucous membrane must have been insufficient to permit a normal imbedding of the ovum, it burrowed into the muscle, as it does in a tubal pregnancy, taking the place of an intramural fibroma and thinning out the left uterine wall.— *Ein Fall von Gravidität nach Sterilisation durch Atmokausis. Zentrbl. für Gynäk.*, No. 6, 1907. Carey Culbertson.

BOOK REVIEWS

METABOLISM AND PRACTICAL MEDICINE. By Carl von Noorden, Professor of the First Medical Clinic, Vienna. Anglo-American Edition, under editorship of I. Walker Hall, Professor of Pathology, University, Bristol.

Vol. I. The Physiology of Metabolism. By Adolf Magnus-Levy. Berlin. Cloth. Pp. 450. Price, $4.00, net.

Vol. II. The Pathology of Metabolism. By Carl von Noorden, Fr. Kraus, Ad. Schmidt, W. Weintraud, M. Matthes, and H. Strauss. Cloth. Pp. 525. Price, $6.00, net. Chicago: W. T. Keener & Co. 1907.

The Anglo-American edition of Professor von Noorden's eminently practical text-book on the physiology and pathology of metabolism, the first two volumes of which are before us, will be cordially welcomed. The interest displayed in the problems of nutrition by the general profession during recent years constitutes one of the most encouraging indications of the modern trend of medical thought, and its influence on present-day clinical practice and therapy is already apparent. An attempt to fill the need for practical works on the problems of nutrition has been made by American authors, the recent volume of Professor Lusk entitled "The Science of Nutrition" being a contribution toward that end. The volumes of Professor von Noorden's treatise contain the most complete and authoritative review of this broad field, and constitute a work which appeals directly to the practicing physician by reason of its extremely practical character. The eminence of its authors in the scientific world furnishes a guarantee of the high standard of the work.

Professor I. Walker Hall, the English editor, has contributed to the high traditions of the original work by the discriminating manner in which he has fulfilled his task. He has added such new matter as was necessary to bring it up to date. This work is no mere compilation of facts and theories. The subjects discussed are divided and subdivided in such a manner as to facilitate reference and avoid confusion. Much of the detail which so often cumbers the pages of works of this character, thus detracting from their value to the physician, is judiciously omitted. Facts and theories are passed in review without too much elaboration, and are subjected to critical discussion.

Volume I, under the authorship of Professor Adolf Magnus-Levy, of Berlin, is devoted to the physiology of metabolism. Theories are given little mention unless they have some basis in the demonstrated figures of research, the subject of normal metabolism being discussed purely on the basis of results obtained by experimentation and observation. The author adds greatly to the practical interest of his discussion by reviewing the effects of various disturbances (inanition, plethora, fatigue, constipation, climate, etc.), and the effects of various drugs on the assimilative functions. Indeed, the author's treatment of the subject of normal metabolism is characterized throughout by strong practical bias, and he reverts again and again to the pathologic in contrast to the physiologic, thus preparing the student for a better comprehension of what is to follow in subsequent volumes on the morbid perversions of metabolism.

Volume II, which deals with the pathology of metabolism, is the combined work of von Noorden, Fr. Kraus, Ad. Schmidt, Weintraud, Matthes, and Strauss. To undertake a critical examination of this volume in detail would be impossible in this place, and unnecessary. It will suffice to say that therein will be found the most satisfying and practical discussion of the subjects dealt with, at present available. The headings of the various chapters show the field covered:

Hunger and Chronic Starvation.

Over-Feeding.

Metabolism in Fever and Infection.

Metabolism in Diseases of the Stomach and Intestines.

Metabolism in Diseases of the Liver.

Metabolism in Diseases of Respiration and Circulation.

Metabolism in Diseases of Blood.

Metabolism in Diseases of Kidney.

An excellent bibliography accompanies each section in the text, and it is a pleasure to note recurring references to the work of American investigators — a consideration not often shown in German text-books.

The books are printed on unusually good paper, and are light and easily held for reading. Medical books have become so bulky and heavy as to make it a matter of actual physical work to read them without the help of a book-rest. Although these

volumes are large, they are light in weight and easily handled.

W. T. Keener & Co. are the American publishers, and they deserve the thanks of the profession for furnishing us with a home edition of so valuable a work. ARTHUR R. ELLIOTT.

THE PRINCIPLES AND PRACTICE OF MODERN SURGERY. By Roswell Park, A.M., M.D., LL.D. (Yale), Professor of the Principles and Practice of Surgery in the Medical Department of the University of Buffalo, etc. With 722 engravings and 60 full page plates in colors and monochrome. Philadelphia: Lea Bros. & Co. 1907.

This later addition to the ranks of text-books of surgery amply justifies its existence. It is intended to replace the "Treatise of Surgery by American Authors," edited by Prof. Park, and the happy issue attained by the talented author makes it a worthy successor of that well-known text-book.

While it is obviously impossible to present much that is new in a work of this character, nevertheless a certain amount of originality of arrangement and expression of the well-known facts can be exhibited. This has been most ably demonstrated by the author. His ability of simplifying intricate subjects without sacrificing any of the essential facts is evident throughout the various chapters, while his unquestioned standing as a surgeon of the highest ability rob the terse and positive statements of all spirit of dogmatism. It seems that no attempt has been made to discuss elaborate theories and to load the student with the burden of an endless array of possibilities in discussing the various phases of surgical diseases. Rather, the author has contended himself with stating as truths those accepted things which are true in the great majority of instances. This brings the student to a full understanding of the essential, allows him to get a clear and well-defined mental image of the condition described, and does not lead him adrift on a sea of probabilities and possibilities where he cannot find his bearings.

That the work is thoroughly modern and up-to-date is shown by the discussion of some of the newer discoveries of modern surgery. Such subjects as the opsonins, the status lymphaticus and the nature of the virus of syphilis may be mentioned as examples in this connection. The chapter on gunshot wounds, considering the effects of modern high velocity projectiles, takes into account the results noted in the Russo-Japanese war; it is intensely interesting.

The chapters on pathology are of unusual value, and it would seem that the author has succeeded in presenting this part of the subject in a way that must make it easily assimilated by the student and general practitioner. The chapter on malignant tumors and the discussion of their etiology brings up the question of their ultimate cause. The author inclines toward the parasitic origin of these growths.

It is a pleasure to note that some of the less important divisions of the surgical science have been successfully condensed. Amputations, resections, ligation of arteries, and fractures, dislocations, at one time formed the greater part of the surgeon's domain, while they occupy only a small part of the modern surgeon's attention. While some of the text-book writers still give them the prolix descriptions of the older authors, the author of Park's surgery has relegated them to their proper position and considered them briefly, but not the less succinctly. Gynecological surgery has been entirely omitted, and with propriety, as this subject is usually handled *in extenso* in American medical colleges.

The illustrations are of particular value. To quote from the author's preface, he "has been free to employ illustrations, whenever a point could be so explained to the eye. Utility and effectiveness have been considered of more importance than extreme and unusual cases."

After a careful perusal of this book, it can truthfully be said that the author has been most successful in carrying out his plan, that the work should represent "the *net* surgery of to-day, obsolete and obsolescent material having been excluded, and the pages being devoted to sound principle and practice, stated as clearly and succinctly as possible."

The publishers are to be congratulated on the excellent appearance which the book presents. There can be no doubt that Park's "Modern Surgery" will be immediately adopted by many surgeons as the standard text-book, to be recommended to their students, and that it will replace the bulk of those at present in vogue. It will also make many friends among the ranks of the general practitioner, who will find it an excellent means of again coming abreast of the latest of advances of surgery, without himself being put to the necessity of separating the wheat from the chaff.

ALBERT E. HALSTEAD.

DISEASES OF THE INTESTINES AND PERITONEUM. By Prof. Dr. Hermann Nothnagel, late professor of special pathology and therapy, University of Vienna. Edited with additions by H. D. Rolleston, M.A., M.D., F.R.C.P., Physician to St. George's Hospital, and the Victoria Hospital for Children, London. Second edition thor-

oughly revised. Authorized translation from the German under the editorial supervision of Alfred Stengel, M.D., Professor of Clinical Medicine in the University of Pennsylvania. Philadelphia and London: W. B. Saunders Company. 1907.

Since the first editlon of this work was published in 1904, its eminent author has passed away. This volume on the Intestines and Peritoneum, and the admirable system known as Nothnagel's practice, of which it forms a part, constitute a wonderful token of the scientific activity and accomplishment of this world-famous authority. It is a remarkable indication of the eager reception accorded this encyclopedic volume in this country, that a second American edition is called for in the short space of three years. The editor, Dr. Rolleston, was highly commended at the time of its original publication for the judgment and thoroughness with which he had performed his task. In the second edition he has found it necessary to make a considerable number of additions, in order to bring the volume up to date, and also to rearrange and modify somewhat his editorial contributions to the edition of 1904. The result of his labors is a volume which in every way thoroughly covers the subjects treated. Over one hundred pages of text are devoted to the ever-important subject of appendicitis. Sine 1904, special works on the appendix have been published by Kelly and Hurdon, and by C. B. Lockwood. Numerous citations from these works are incorporated in the editor's additions. In discussing the question of when we shall operate for appendicitis, the author deprecates "the rule," except when the assumption is well founded that we are dealing with the gangrenous or phlegmonous type of inflammation, preferring under other circumstances to consider each case on its own merits, treating the cases medically at first, and operating later, if necessary. On other subjects of medical-surgical nature his stand is equally free from radicalism, on the one hand, or ultra-conservatism, on the other. The volume will be found to constitute "the last word" on diseases of the intestines and peritoneum.

A. R. E.

THE OPERATING ROOM AND THE PATIENT. By Russell S. Fowler, M. D. Philadelphia and London: W. B. Saunders Company. 1907.

This volume which consists of about 270 pages of text contains much useful information. The illustrations are especially instructive. The mechanical work is excellent, the type large and clear, and the book is fully indexed. There is much to commend in the book. A few criticisms are permissible. Some typographical errors are present. For instance, on page 192, the word decubitus is spelled *decubitis*. The author does not at all make use of the metric system in his work. In our opinion, increased familiarity with the metric system can but be of use in the dispensing of pharmaceutical preparations. This is a sin of omission, hard to understand in view of the simplicity of the metric system and of its general adaptation in the scientific world. An interesting, but not very complete chapter on anesthesia is included. The drop-method of ether anesthesia is employed. The technique and the limitations of spinal anesthesia are well stated. The different operative positions, as, for instance, the reversed Trendelenburg operation, are well illustrated. Illustrations, when well executed, quickly and accurately convey to the reader the author's conceptions. A very practical chapter, and the preparation of which, in our opinion, must have demanded painstaking care, is the closing chapter of the work. It gives in tabulated form a complete list of the dressings, instruments, etc., needed in operations upon the different portions of the body.

AIMÉ PAUL HEINECK.

THE PRACTICE OF OBSTETRICS. By American authors. Edited by Charles Jewett, M. D., Professor of Obstetrics in the Long Island College Hospital, Brooklyn, N. Y. In one octavo volume of 820 pages, illustrated with 484 engravings, 46 of which are in colors, and 36 colored plates. Third edition, revised and enlarged. New York and Philadelphia: Lea Brothers & Co. 1907.

Jewett's Practice of Obstetrics has for some years held rank as one of the most serviceable, both for the student and practitioner. The various authors' contributions have been planned and edited in such a way as to give homogeneity and completeness to what would otherwise be patently a composite work. Hence the book is a compilation that sounds the note of authority. The matter is presented simply, concisely, and after a plan well adapted to the teacher's and student's use.

Among the changes from the previous editions are the chapters contributed by W. S. Stone on Changes in the Maternal Organism Caused by Pregnancy, the Duration of Pregnancy, the Hygiene and Management of Pregnancy, the Anomalies and Diseases of the Fetal Appendages and the Diseases of Pregnancy. The chapter of Ectopic Gestation stands practically as rewritten for the second edition, but, as presented at this time, may be regarded as a posthumous work of its author, Fernand Henrotin. E. H. Bartley is the present contributor of the chapter on Malformations, Injuries, and Diseases of the New-born Child. Other

portions of the work show considerable revision, notably the chapters contributed by Dr. Jewett himself.

CAREY CULBERTSON.

GYNECOLOGY AND ABDOMINAL SURGERY. Edited by Howard A. Kelly, M. D., F. R. C. S. (Hon., Edin.), and Charles P. Noble, M. D. Illustrated by Hermann Becker, Max Brödel, and others. Volume I. Philadelphia and London: W. B. Saunders Company. 1907.

Volume I of Kelly and Noble's pretentious work on Gynecology and Abdominal Surgery is a magnificent book, handsomely printed, illustrated and edited. This first volume treats of the following subjects as indicated by the chapter heads: Gynecologic Technic; Bacteriology; Pathology of the Reproductive Organs; Medical Gynecology; Non-plastic Operations of the Vulva and Vagina; Plastic Operations on the Perineum, Vagina, and Cervix, Curettage of the Uterus, and Inversion of the Uterus; Combined Gynecologic Operations; Diseases of the Bladder and Urethra; Vesical Fistulæ; The Preparatory Treatment of Celiotomy Cases; After-Treatment of Celiotomy Cases; The Celiotomy Incision; Operations for Retrodisplacement and Prolapse of the Uterus; Ovariotomy; Vaginal Section for Diseased Ovaries and Tubes; Removal of the Uterine Appendages; Abdominal Hysterectomy for Inflammation of the Uterine Appendages; Vaginal Drainage for Pelvic Abscesses; Abdominal Hysteromyomectomy and Myomectomy; Vaginal Myomectomy; Radical Abdominal Hysterectomy for Cancer of the Uterus; The Byrne Method of Treatment of Carcinoma of the Uterus; Vaginal Hysterectomy; Conservative Operations on the Ovaries and Tubes; and Operations Before Puberty.

The scope of the work, the incentive of the authors and the methods employed in accomplishing its execution can best be gained by the authors' own words:

"In the preparation of this work the editors have been continually impressed with the intimate relationship which exists between gynecology and abdominal surgery. Our associates, competitors, and generous critics, the general surgeons, will not deny that the great advances made in the gynecologic field have constituted the very backbone and the marrow of the abdominal surgery of to-day, and that pari passu with the labors of the gynecologists have gone the developments of the surgery of the abdomen at large. The volumes embracing both subjects are living witnesses of the unity of gynecology and abdominal surgery in the practical field, which it is our pleasure to proclaim, as we thus once more assert the unity of our art and the fraternity of those who practice it.

"In planning our work the usual classification of the handbooks has been set aside, in order to substitute one of greater practical value to the general practitioner, to the investigator, and to the surgeon.

"A considerable section is devoted to medical gynecology, to meet the needs of the general practitioner who will find the information he requires concentrated in one section, without being under the necessity of searching here and there throughout both volumes.

"Certain obstetric or gynecologic-obstetric subjects have been included in our list, such as the puerperal injuries and infections, the treatment of incomplete abortion, ectopic pregnancy, and the Cæsarean operations. It is believed that this will prove not only of practical value to the physician, but will give the general surgeon practicing abdominal surgery without an obstetric training a broader and fuller view of the subject.

"Separate chapters have been devoted to the systematic consideration of the bacteriology and the pathology of the diseases of women. Those wishing to investigate the scientific basis of gynecology will find it suitably set forth in these sections. We believe that no other monograph on pathology as complete as this has as yet appeared in the English language.

"Other special chapters have also been written upon subjects usually found only in monographs; such as operations during pregnancy, operations before puberty, conservative operations upon the uterine appendages, and the complications of operations.

"Surgical gynecology and abdominal surgery proper have been broadly and liberally dealt with. We have naturally devoted our especial attention to modern surgical technic, and have been at pains to provide that the operations themselves should be profusely illustrated with fresh, accurate, and graphic drawings.

"To prevent undue expansion of our work, space has been spared by omitting elementary matters found in every text-book.

"The historical development of gynecology and abdominal surgery has been carefully treated, showing the prominent part played by American surgeons in these fields.

"Concerning the relative advantages of the abdominal and the vaginal route for the performance of various operations there are still decided differences of opinion. Here we have presented the claims of the two schools from the affirmative standpoint, by selecting tried advocates to present each side.

"The illustrations have been done by, or under the supervision of Mr. Hermann Becker, who has devoted more than four years to his work; almost all the drawings are from his hand; some have been made by Mr. Max Brödel, and others.

"Three of our collaborators, Drs. Alexander J. C. Skene, Wm. R. Pryor, and Fernand Henrotin, have died during the preparation of this work. We take pleasure in presenting to the profession their last contributions to gynecology.

"This work is the first in which the attempt has been made to cover both the fields of gynecology and of abdominal surgery. Its subject-matter has been further broadened by the consideration of medical gynecology, of various practical subjects usually dealt with only in monographs, and also the gyneco-obstetric field. We hope that this will make our work unique in its presentation and in its claims upon the consideration of the profession."

The authors selected to write these volumes are: Brooke M. Anspach, M. D; J. M. Baldy, M. D.; J. C. Bloodgood, M. D.; Henry T. Byford, M. D.; John T. Clark, M. D.; George M. Edebohls, M. D.; John M. T. Finney, M. D.; William W. Ford, M. D.; Anna M. Fullerton, M. D.; Fernand Henrotin, M. D.; Barton Cooke Hirst, M. D.; Guy L. Hunner, M. D.; Elizabeth Hurdon, M. D.; George Ben Johnston, M. D.; Howard A. Kelly, M. D.; Beverly MacMonagle, M. D.; Edward Martin, M. D.; Floyd W. McRae, M. D.; G. Brown Miller, M. D.; B. G. A. Moynihan, M. S.; John B. Murphy, M. D.; Charles P. Noble, M. D.; Richard C. Norris. M. D.; J. A. Ochsner, M. D.; Eugene L. Opie, M. D.; James F. W. Ross, M. D.; Alexander J. C. Skene, M. D. J. C. Webster, M. D.; X. O. Werder, M. D.; and J. Whitridge Williams, M. D.

A critical analysis of this work will be furnished to our readers when the second volume is published and placed in our hands. In the meantime, the reviewer can assure the reader that the work, judging from the first volume, will rank as one of the classics of gynecology and surgery.

ELEMENTS D'OBSTETRIQUE. By V. Wallack. Paris: G. Steinheil, Editeur.

Professor Wallack presents a work which, as far as it goes, is ideal. It is written in a plain, unvarnished way, devoid of any ambiguous statements, and in this respect is a book worthy of emulation by many text-book writers of to-day. Every subject is presented in a systematic way, complete in every detail as to text. The subject of forceps, for instance, is made clear to the student and leaves nothing wanting. The indications and conditions for the use of the forceps, the technic in their use and the kind of forceps to use leaves nothing to be doubted.

The book is printed upon thin paper with a flexible cover, contains 650 pages, is about one third the size of the usual text-book as to volume, which is certainly an advantage. To be regretted is the limited number of illustrations, poorly printed and placed in the back of the book instead of with the text. The omission of the anatomy and physiology of pregnancy renders the book an incomplete one, and it is to be hoped in future editions that the author will see the advisability of adding this department to his excellent work.

CHAS. E. PADDOCK.

AMERICAN PRACTICE OF SURGERY. By Bryant and Buck. Volume II. New York: William Wood & Co.

The second volume of the Bryant and Buck System presents many of the admirable features of the first volume, and we can safely assume that the standard established will be maintained throughout.

The first chapter, on leprosy, is very complete, covering twenty-seven pages, including four full-page, well executed, colored plates of various types of the disease. The entire discussion of the subject leaves little to be desired.

Chapter II discusses plague in a careful and painstaking manner. It occupies thirteen pages with many valuable cuts.

Glanders and anthrax are next considered and are treated of in an adequate manner comparable with their relative clinical importance.

Actinomycosis is a disease of rather frequent occurrence, and it would seem to us that a discussion of this subject, which covers only four or five pages, is hardly sufficient for a system which promises to be as complete as this one.

The remaining portion of Part VI is devoted to the consideration of mycetoma, rhino-pharyngitis mutilans, and scurvy.

Part VII is devoted to the subjects of tuberculosis and syphilis from a surgical standpoint.

The treatment of the subject of tuberculosis is very complete, and quite adequate for the general discussion of a disease which must of course be considered again and again in relation to special organs.

The discussion of the subject of syphilis is remarkably clear-cut and complete. It is one of the most carefully written and scientific chapters of the volume.

Part VIII occupies about three hundred and eight pages of the volume, and the subject of suppurative inflammations and surgical diseases of

some of the special tissues are considered under these headings: Abscess, Ulcers and Ulcerations, Gangrene and Gangrenous Diseases, Surgery of Diseases of the Skin, Surgical Diseases and Wounds of Muscles, Tendons, Bursæ, Connective Tissue, Nerves and Lymph Nodes and Vessels.

This section is well illustrated with many cuts and colored plates which aid in the elucidation of the subject and add materially to its completeness.

We cannot agree with all the authors' opinions in their discussion of the pathology and the treatment of suppurative processes, but in the main the text is scientific and well written. The chapter on surgical diseases of the skin is well illustrated and complete in text, but its scientific value is lessened by the authors' statements in the introductory remarks relative to the treatment of epithelioma.

Part IX. This section considers the subjects of burns and the effects of electric currents and lightning. Frost-bite is also discussed.

The last part deals with the wounds of soft parts, including gunshot wounds.

It can be said of this chapter that it is scientific, complete and will unquestionably prove to be of great value to military surgeons as well as civil surgeons who have to deal with gunshot injuries.

The general make-up of this volume from a printer's viewpoint is excellent. The paper, illustrations, type, and binding are examples of the best in the printer's art.

OBSTETRICS. By J. Whitridge Williams. Second edition, Appleton's.

In passing into its second edition, this splendid text-book has received numerous additions to its illustrations and letterpress.

The chapters on the development of the ovum and upon the Toxemias of pregnancy have been carefully revised and brought up to date, while much new material has been added in the chapters on metabolism of normal pregnancy, vaginal Cæsarean section, pubiotomy and contractions of the pelvic outlet. In its fine coherency and constant harmony this book excellently illustrates the superiority of a work developed out of the investigations and experience of one man over books made up of many contributions by writers of no matter how great eminence, for however careful the supervision may be, it is never possible to eliminate entirely the duplications and contradictions, nor to conceal the joints at the points of contact.

The signs of pregnancy are concisely and adequately classified, the chapters on hemorrhage, eclampsia, and pelvic contractions are covered most satisfactorily, while none of the minor points, which are so important in a text-book, are anywhere lacking.

Due mention is made of every necessary item in the art of obstetrics and treated in accordance with its relative value and importance, so that perfect balance is obtained throughout the book.

Credit is given everywhere where credit is due, in the broad, liberal and scholarly spirit, and the bibliographical annex to each chapter, unusual in an American text-book, is a constant source of interest and delight. The illustrations are apt and abundant, and the letterpress all that could be desired.

Williams' work is very difficult to review, since one is constantly tempted to run into what might seem to be extravagancies, and yet, when one begins to mention the various excellencies it is impossible to stop.

When the first edition of the book appeared the writer of this review sat up half the night, as one would with a fascinating novel, in an enthusiastic and jubilant perusal of the work. The exquisite literary style which is so rarely seen in combination with the scientific method, contributes an unusual charm to the enjoyment of the reader. Without being fulsome in praise, and yet with the feeling that the reviewer is not doing full justice, one can only say that Williams' Obstetrics unites in one harmonious and delightful volume all the attributes which go to make a perfect text-book for student or practitioner. C. B. REED.

BOOKS RECEIVED

DIE ENTWICKLUNG UND FORM DES FÖTALEN BECKENS. Von Dr. Edmund Falk, Frauenarzt in Berlin. Mit 6 Abbildungen im Text und 5 Tafeln. Berlin 1908. Verlag von S. Karger.

A TEXT-BOOK OF PRACTICAL GYNECOLOGY. By D. Todd Gilliam, M. D. Second Revised Edition. Extra cloth, $4.50 net; half morocco, gilt top, $6.00 net. Sold only by subscription. Philadelphia: F. A. Davis Company. 1907.

THE PANCREAS. ITS SURGERY AND PATHOLOGY. By A. W. Mayo Robson, D.Sc. (Leeds), F.R.C.S. (Eng.), of London, and P. J. Cammidge, M.D. (Eng.), D.P.H. (Camb.), of London. Philadelphia and London: W. B. Saunders Company. 1907. Cloth, $5.00 net; half morocco, $6.50 net.

DISEASES OF THE SKIN. By Henry W. Stelwagon, M.D., Philadelphia. Fifth edition revised. Philadelphia and London: W. B. Saunders Company. 1907. Cloth, $6.00 net; half morocco, $7.50 net.

NICHOLAS SENN, PH. D., M. D., LL. D.

THE announcement of the death of Dr. Nicholas Senn has filled the hearts of the medical profession of the world with grief, and brought sorrow to all classes of the commonwealth in which he lived. The editorial staff of SURGERY, GYNECOLOGY AND OBSTETRICS mourn the loss of their senior colleague, their esteemed and beloved councilor and companion.

The citizen Senn was of Chicago and America; he has passed from our midst. The Surgeon Senn was of the world; he lives, and will continue to live for all time, in the art and science of surgery, which he adorned and enriched. A review of his life, struggles, and achievements forces the conviction that surgeons are born, and not made; that opportunities are forced, and not found; that genius and real talent find the place and the way.

Nicholas Senn was born in the Canton St. Gaul, Switzerland, October 31, 1844. He came with his parents to America, 1852, and settled in Ashford, Wisconsin, then a frontier town. He graduated from the Fond du Lac high school, 1864, after which he taught country school for two terms. During this period he made a close study and botanical analysis of the flora of that district. He loved nature and was always happy when close to it. He was endowed by inheritance with an excellent physique. He had a splendid memory and a clear, forceful mind, all of which sustained him in his indefatigable labors.

In 1865 he began the study of medicine at the Chicago Medical College, and graduated from that institution in 1868. In the competitive examination at the close of his college course, he won the position of resident in Cook County Hospital, sharing the honor with his classmate and lifelong friend, Professor William E. Quine.

He began the practice of medicine in the hamlet of Elmore, Wisconsin. Five years later he moved to Milwaukee and became a member of the hospital staff. 1877 and 1878 he spent in the University of Munich, Germany, from which he graduated in the latter year. He returned to Milwaukee and continued the practice of medicine until 1893. During that time he carried on continually animal experimentation in various lines. While practicing in Milwaukee, he was called to the chair of surgery in the College of Physicians and Surgeons in Chicago. Two days a week he came eighty-eight miles to deliver his lectures and conduct his clinics. His superiority as a teacher was immediately appreciated. So clear and forceful were his clinical presentations, and so thorough his knowledge of pathology and surgical principles, that his lectures were not only attended by the full student body, but were patronized by a large number of practicing physicians and surgeons, not infrequently including that master surgeon, Christian Fenger.

In 1888 he became professor of surgery and surgical pathology in Rush Medical College. In 1891 he succeeded the late Charles Theodore Parks in the chair of practice of surgery and clinical surgery in Rush Medical College, the most important surgical appointment west of the Alleghenies.

We naturally ask, Why these rapid promotions? Dr. Senn realized in early life that all that was necessary to success was to lay hold of that which was within easy reach and appropriate it to the service of his art and science; in other words, to do things now and with the present.

While yet a country practitioner in Wisconsin, he applied himself to the real task of learning Nature's laws by experimenting with Nature's materials, for the purpose of establishing definite principles of repair. His industry, zeal and perseverance were recognized qualities. He had the self-imposed task of self-education, and was responsible to an uncompromising master.

He was one of the first on the Western Continent to conduct systematic and original animal experimentation; this work proved a great factor in his evolution as a surgeon, pathologist and teacher. Of these early days, an old practitioner relates: "Young Senn always came to the State Medical Society meetings with a large manuscript, not full of words and theoretical dreams, but replete with careful experimental observations and supported by specimens from his experimental laboratory — his stable loft. He presented his subjects with such enthusiasm and force, that their acceptance was irresistible, and we all went home from the meeting inoculated with new material for thought and reflection."

With these incontrovertible facts from Nature, he broke through the barriers of surgical tradition and stilted experience, and established as a requisite basis for surgical procedures, a knowledge of Nature's methods. Meeting all the requirements of an extensive and exacting practice in the daytime, he carried on at night, in association with Dr. M. E. Connell, at Wauwatosa, the enormous experimental work which evolved the splint principle of anastamosis, and the Senn decalcified bone plate in intestinal surgery, and, while the bone plate has become obsolete, the principles established and observations recorded in these experiments will always remain valuable in abdominal surgery. Who in that vast audience at the International Medical Congress, in Washington, 1888, could forget how that scientific body was held spellbound for two and one-quarter hours while he related his experiments on the intestines and demonstrated his specimens. What an outburst greeted "the Little Giant from the West," when he built the arch and placed the keystone in the structure of intestinal anastamosis, an enduring monument to American surgery.

This work was supported by his experiments on the blood-vessels, bones and joints, intercapsular fractures, hydronephrosis, surgery of the pancreas, etc. His was the first thorough work on the pancreas, and is referred to continuously; he was truly "the father of surgery of the pancreas."

His works are so well known that it would be superfluous to enumerate them. In surgical controversies from which he kept aloof his referendum was his experimental laboratory. His physical endurance was great; for years his average sleep was four hours. He had no time for frivolities, and little, if

any, for pleasure. He was always "engaged in a great and glorious work and could not come down." Gross, Fenger and Senn did for clinical, experimental, and bacteriological surgery in America what von Langenbeck, Billroth, and Volkmann did for German surgery.

As a teacher he was pre-eminent. He had the faculty of imparting knowledge with such force and precision as to command continued attention and produce lasting impressions. All this was due to his familiarity with the subject and the enthusiasm with which he was imbued.

"To be able to understand and appreciate the best that has been said and done is the fairest fruit of culture."— (Spalding). In this he was a striking example. His mind was a veritable library of all that had been done in medicine, surgery and the allied sciences. It was indexed and cross-indexed. He had assiduously studied the lives and works of others and their results were at his command. One was astounded to hear him in his clinics give the name and address of the author, the place and date of publication, of every important advance, and the statistics on any line of cases that came before him for examination and treatment. He had the faculty of presenting the salient points of clinical cases in such a terse and forceful manner, clothing them in such purity of diction, that they were ready for publication without revision. In addition, he was an ardent actor in the clinical arena, always enkindling enthusiasm, and creating a thirst for a deeper insight. He was in every sense an educator, never failing to arouse, inform, inculcate and inspire. His clinics were a veritable fountain of medical truths and virtues. His words were of wisdom, and his actions of thought. He did not found a personal school, as did von Langenbeck, Billroth, Pasteur and others, but he created a diffuse and general scientific professional sentiment that permeated the western hemisphere. Note the number and character of the men who received much of their early training and professional inspiration from him. "By their fruits ye shall know them." A teacher is known by the character and quality of men whose destiny he shaped or helped to shape. The doing and thinking surgeons of Western America are the products of Gross, Gunn, Fenger, and Senn. Senn's writings are extensive, and cover a wide range of thought; they show a profound surgical wisdom, as well as a keen discernment between the theoretical and demonstrable. He ever emphasized the practical application of principles.

His manuscripts constitute one hundred and sixty large volumes. A few of his writings only need be mentioned. His "Principles of Surgery," "Experimental Surgery," "Practical Surgery," "Tuberculosis of the Genito-Urinary Organs," "Tuberculosis of Bones and Joints," "Intestinal Surgery," "Pathology and Surgical Treatment of Tumors," "Surgical Bacteriology," etc., etc., are in every library, and are most important text and reference books. Some of his works are incomplete. This is easily accounted for by those who knew him. The speed with which he rushed from one field of activity into another and less cultivated zone, and one apparently needing his force and energy for immediate professional and general relief, caused him to leave works, accurately outlined and well under way, to others for completion. His every publication was a potent factor in the advancement of the subject. Dis-

semination of knowledge was one of his passionate delights, overtaxing himself both physically and mentally. His non-medical writings were frequent; his versatility and style were attractive, and his travel notes show he was a true medical explorer of distant and unknown countries.

As a man, he was of simple habits, retiring, and domestic. He formed few friendships, but those with fervor and loyalty. He never talked of originality or priority of action. He improved on the thoughts and works of his illustrious predecessors. He was, above all other things, a student. His greatest pride was in thinking and doing, not in acquiring.

He donated his services freely to the public; he was generous, in this particular, even to a fault. To medical education, he gave not only his time and energy, but munificent donations. One of these, a clinical building to Rush Medical College, is devoted to clinical and laboratory purposes, and cost approximately $100,000.

He had probably the best private medical library in America, including in it the library of Professor Wm. Baum, of Göttingen, and the collection of DuBois Raymond, all of which he donated to the John Crerar Library, for the use of the medical profession.

Senn was greatly interested in military matters. He was Surgeon-General of the National Guard of Illinois; he was Chief Operating Surgeon in the field during the Spanish-American war, with rank of Lieutenant-Colonel. He was the founder and President of the Association of Military Surgeons of the National Guard of the United States. He was Professor of Principles of Surgery and Military Surgery of the University of Chicago.

He was continually honored by the medical profession, having been President of the American Medical Association, and practically all of the leading medical organizations, and many times represented America at the International Congress, where he was always an honored and welcome member.

He was not faultless; to say this of him would be to misrepresent him, and he was good enough without the questionable advantage of false praise; the profession and people loved him, not for his defects, but in spite of them. He was apparently selfish in some things; men of genius always appear in that light, as their work is imperative — results must be attained. His lofty ideals and integrity of purpose dominated his every act, and controlled his destiny.

As years and wealth of knowledge accumulated, they, to him, seemed to open up an endless abyss of the unknown; stimulated a greater and more earnest desire, a more strenuous effort. The student of his motives can see in his labors an illustration of the beautiful words of Spalding, "Whatever purpose a man cherish, whatever task he sets himself, he finds his work stretching forth endlessly. The more he attains, the more clearly he perceives the boundless unattained." Senn laid down his labors when, to him, it seemed there was most yet to be accomplished.

JOHN B. MURPHY, M. D.